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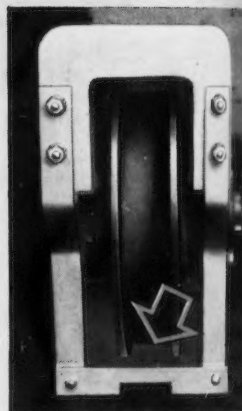
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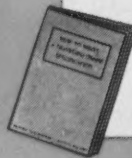
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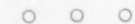
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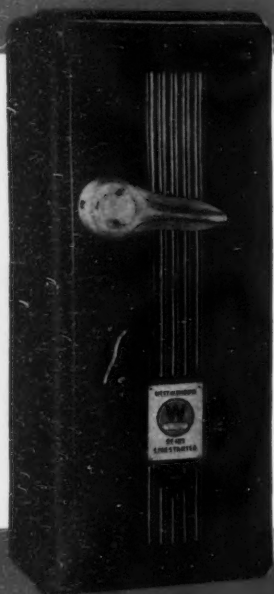
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The Iron Age

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ESTABLISHED
1855



The Man in the Moon

THE current wave of price rises, outside the metal working industry, and the vociferous conversations from Washington with respect to controlling them remind me of a story.

Once upon a time there was a precocious lad who was good at figures. In addition to this he had a self confidence quota that, as usual with precocious lads, was considerably above par.

This youngster became interested in tides, during a vacation spent by his family at an ocean beach. He noted that approximately twice a day a considerable portion of the beach was covered with salt water, due to tidal effect.

Looking up the statistics on the American coast line and figuring that the average encroachment of the rising tide was about 100 ft. of beach, the youngster figured that tidal effects were depriving the American continent of some several hundred million square miles of territory that was under water about half of the time.

He ran to papa with his findings and said to him: "Pop, I wish that you would give me permission to control the tides, for I will then add a lot of usable territory to this continent." And pop, being a busy man whose mind was occupied with many other things, said: "OK, son, you have my permission."

So sonny went down to the beach and when the tide began to come in, he addressed the rising waters vigorously. "Don't you dare," said he, "to come in an inch farther or I will tell my papa on you!" But the ocean waves paid no attention to him whatever and continued to encroach upon the beach.

Our young friend was reduced to tears by the apparent failure of his scheme to make America a bigger and better continent. A stranger, walking along the beach, noticed his grief and enquired as to the cause of it. "Boo, hoo," the boy replied, "I have told the naughty tide to stop coming in, but it does not pay any attention to me."

"Well, son," said the man, "if you are aiming to control the tide, you must first control the moon, because the moon controls the tides."

So sonny ran to papa again. Said he: "Pop, I want you to make the moon behave, because if it doesn't, I can't make the tide stop coming in."

And pop, paying attention this time, said: "Sorry, my boy, but I am afraid the moon is a little too high for me to reach successfully."

Now to apply the analogy. Just as the moon is the principal cause of fluctuations in tides, so are labor wages the principal causes of price movements. And it is as useless to try to regulate prices without regulating wages as it was for little Johnny to try to command the ocean tides without first getting control of the moon.

Maybe the man in the moon is responsible. Nobody ever was able to say definitely who he was. Maybe he is John Lewis or William Green or somebody like that. At any rate nobody on this earth seems able to reach and regulate him.

John Van Dusen



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BASIC

OPEN

HEARTH

By J. H. CHESTERS

Central Research Department, United
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IN the previous series of articles, *THE IRON AGE*, Feb. 6 and 13; May 22 and 29, 1941, an account was given of the great variety of refractories used in the open hearth furnace above the sill plate level. The data herein deal mainly with the refractories used in the hearth and in the checkers, but reference will also be made to those employed in the construction of the gas and air uptakes, slag pockets and valves. In general all these parts (with the exception of the hearth) are constructed of silica or fireclay brick, but the particular quality used depends upon the severity of the working conditions. Thus, for the bottom of the checkers medium alumina fireclay brick are adequate, but at the top of the checkers where the temperature is higher, silica brick or high alumina fireclay brick are employed.

The Hearth

Sections 7, 8 and 9*

The terms used to describe the different sections of the hearth vary considerably from one plant to another. Thus the sloping part of the hearth at the back and front of the furnace are described at some plants as the "breasts" and by this is meant not only the dolomite or magnesite covering, but also the backing brick. In the present account, the brickwork of these

Continuing the discussion on basic open hearth refractories (*THE IRON AGE*, Feb. 6 and 13; May 22 and 29, 1941), the present series of three articles, of which this is the first, deals mainly with refractories used in the hearth, checkers, and below the sill plate level. These data are particularly timely, what with the growing interest here in basic construction for improved open hearth efficiency.

parts will be described as the "banks" and that at either end as the "bridge banks," the term "breasts" being used exclusively for the fettling or rammed material covering these banks.

(A) CONSTRUCTION:

According to Buell, hearths of up to 85-in. thickness are employed in America, one such hearth consisting of 60 in. of firebrick, 12 in. of magnesite brick and 13 in. of ground magnesite. In Great Britain, on the other hand, the brickwork in a furnace bottom rarely exceeds 12 in. in thickness and is often only 9 in. or 6 in. The examples are extreme but serve to show the wide variations in practice from one plant to another.

Some degree of insulation of the bottom plate is generally achieved by the use of fireclay brick next to the pan and occasionally furnaces are built with a layer of insulating brick, for example, porous silica brick or low temperature insulation of the magnesia-asbestos type, be-

low the firebrick. Such a practice will clearly reduce heat losses and result in a more ready sintering of the monolithic section of the hearth, but may lead to trouble due to the lower temperature gradient in the hearth, and consequent greater penetration of slag and metal. British open hearth furnaces of the 80-ton class are generally constructed with 9 in. or 12 in. of basic bricks (three or four courses set on the flat) with or without a number of firebrick courses beneath. The monolithic hearth above usually has a minimum thickness of about 12 in. The use of such thin hearths is the result of trying to get a bigger steel production per furnace and is associated with the present practice of renewing hearths every two or three years, it being considered more economical to tear out an old hearth and incidentally obtain a high recovery of the bottom bricks than to continue using a hearth requiring a relatively large amount

*Diagram illustrating nomenclature of parts marked "Sections" appeared in *THE IRON AGE*, May 22, 1941, p. 41.

of fettling per ton of steel produced.

Usually the hearth bricks are so arranged (see Fig. 1) as to minimize the risk of a break-out by eliminating straight-through joints. The older practice was to build a horizontal layer of bricks on the pan together with right-angle steps at the sides and to obtain the hearth shape by employing a varying thickness of monolithic material above. More recently the practice adopted is that of varying the brick thickness to give an approximate inside hearth contour and using a monolithic hearth of roughly equal thickness throughout. The older practice of using a flat sub-hearth had the advantage that the necessary expansion allowances could be made along a line under the side and end walls. With the shaped brick hearth, where the expansion joints are left open, there is more risk of their becoming filled, leading to subsequent buckling of the hearth.

The methods employed in constructing monolithic hearths, including the preparation of the dolomite or magnesite used for this purpose, could scarcely be dealt with at all adequately in less than a small book, particularly if the improvements and experience of the last few years were to be included. As a rule, British open hearth furnaces are lined by ramming tarred "basic" (dolomite calcined at a high temperature) to a depth of about 6 in., burning this in position at the highest temperature available, and building up the remaining thickness by throwing on layers approximately 1 in. thick and burning these in position. The alternative methods, namely, ramming or burning-on the whole of the "basic," are, however, also employed. Since the ordinary coarse ground dolomite is difficult to sinter, up to 10 per cent of finely ground basic slag is normally added to the lower layers and then a decreasing percentage as the working face is approached. The addition of this slag is a compromise and if the material is properly graded, that is, contains a sufficient proportion of fine material, the use of slag can be dispensed with. After burning-in, the hearth is slagged, some four to eight tons being required for an 80-ton furnace.

The results obtained vary greatly according to the precise technique employed. Thus the

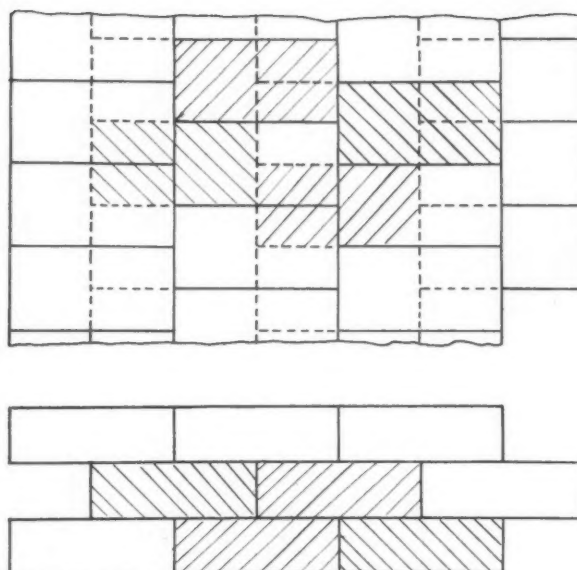


FIG. 1 — Staggering of basic brick in the sub-hearth.

hearth should be properly dried out before the first tarred dolomite layer is rammed in position and only dehydrated tar of suitable viscosity should be used. The amount of tar required to give optimum ramming will usually be found to be between 5 and 8 per cent of the weight of the dolomite. The dolomite should preferably be mixed hot with the tar and if not employed immediately should be preheated to at least 122 deg. F prior to ramming. Hand rammers approximately 4 x 4 x 3 in. thick are normally employed and these are preheated in a coke fire or in a neighboring furnace door to avoid sticking. Given proper control, far better compacting can be obtained by the use of pneumatic rammers. Thus a 3-in. layer after hand ramming can often be reduced by another 1/2 in. by the use of pneumatic rammers. The use of mechanical rammers has often been objected to on the grounds of possible lamination and consequent lifting of the hearth or lack of steel tightness, but if the top surface of a layer is roughened, for example, by means of a pneumatic chisel, before another layer is rammed in position, no trouble due to lamination is in fact experienced.

With tilting furnaces a similar bottom making technique is employed but the thickness of the rammed portion is often considerably reduced and that of the burned-in portion increased. Since the bottom cannot be examined after each cast, being covered with metal for months at a time, it is

essential that the original bottom be as perfect as possible.

The technique employed in installing magnesite hearths is similar but it should be borne in mind that the latter are even more refractory and that if adequate sintering is to occur the material must either be finely ground (see Table II) or some bond (for example) basic slag or mill-scale added. For this reason it is usual to burn-in magnesite hearths rather than ram in layers with a tar bond. The amount of slag required to give adequate sintering in the lower parts close to the brickwork may be as much as 25 per cent, while in certain plants the bricks are subjected to a slag wash prior to burning-on the first layer of magnesite.

(B) MATERIALS:

Brick. As already stated, the insulation used in The United Steel Companies' works has been of the porous silica or magnesia-asbestos type. It is obvious, however, that almost any low or high temperature insulating brick could be employed, provided the remaining thicknesses of brickwork and hearth were such as to insure the insulation not being raised above its maximum safe temperature. Since with thin hearths the risk of a break-through is considerable, many operators prefer to omit insulating brick completely.

The fireclay brick used to cover the pan or the insulating brick layer are generally of the medium alumina type and of a good quality, described in THE IRON AGE, May 29, 1941, in connection with furnace doors.

The properties of a number of typical magnesite and dolomite brick as used in open hearth furnace bottoms are summarized in Table I. As a rule, very dense magnesite brick of the type originally made in Austria are preferred, the porosity frequently being less than 18 per cent. The thermal shock resistance of such bricks is frequently rather low but this is of no consequence since they are not heated up rapidly and in any case cannot fall out of position even if cracked. During the last few years brick made from stabilized dolomite clinker of 13 to 15 per cent silica content have been found to give excellent results in open hearth furnace bottoms and have largely replaced magnesite brick in fixed furnaces. Here again the porosity is frequently below 20 per cent. The modern dolomite brick gives no trouble due to hydration, showing no signs of collapse even after boiling in water for several weeks. It is very strong both cold and at temperature, comparing favorably in this respect with the best magnesite brick. Its thermal shock resistance tends to be low but, provided it is covered by fettling material, this is of no particular consequence. Its slag resistance may not be quite as high as that of magnesite, but both laboratory and works tests suggest that it is adequate for use in this position.

In the United States there has been a marked tendency to replace the magnesite with chrome or chrome magnesite brick, and to cover these with a small layer of chrome plastic. This practice has the advantage that the risk of hydration of a furnace bottom during a shut down is minimized. More recently the working part of hearths have been made of chrome magnesite soldier courses of 9-in. depth covered with a magnesite layer of only about 2 in. to 8 in. in thickness.

Monolithic material. In general the hearth proper in British furnaces is constructed from so-called "dead-burned" dolomite or "basic." Since dolomite, even when electrically fused, still contains free lime and hydrates very readily, the term "dead-burned" is a misnomer. It is, however, true that the hydration rate of "basic" is greatly reduced by high temperature calcination in cupolas. The general practice is to take a relatively pure dolomite stone and to

calcine this in a pressure blown cupola using alternate layers of stone and coke. The temperatures obtained are very high (probably of the order of 3092 deg. F.) while the ash from the coke facilitates the sintering by increasing the flux content of the stone. The porosity of the product varies from about 2 to 30 per cent, averaging about 12 per cent. The bulk density varies from 1.8 to 3.2, averaging about 2.8 gm. per ml., while the specific gravity, which varies very little with the firing treatment, is generally about 3.35. The relation between the bulk density and the firing treatment is marked, and hence the bulk density can be used as an index of the firing received and the probable stability of the material, though some allowance is necessary for the analysis of the product. Ordinary lump dolomite can be stored for several weeks before use, but if crushed it deteriorates much more rapidly. The process of deterioration, often referred to as "perishing," consists in the hydration of the lime in the mixed

oxides. It should not be confused, as it frequently is, with dust produced by grinding. Whether a consignment of dolomite has in fact perished can be readily ascertained by carrying out a loss on ignition test which should not in the ordinary way exceed about 1 per cent. As would be expected, the hydration is most marked with the fine section and hence if the gray lumps in the material are found to be turning white and becoming soft, it may be taken for granted that the consignment as a whole has hydrated.

Normally, lump dolomite is crushed either in a jaw crusher followed by a screen, or in a perforated edge mill, the relatively coarse product being used both for bottoming and for fettling. The use of such coarse and even-size material for the production of linings (see Table II) has long been known to result in high porosity but it is only comparatively recently that trouble has been taken to produce dense hearths by proper grading of the material. The rela-

TABLE I—Properties of Basic Open Hearth Furnace Bottom Bricks

Code No.:	Magnesite Brick M. 4	Magnesite Brick M. 17	Dolomite Brick X. 6	Dolomite Brick X. 7
Apparent porosity, per cent.....	24.2	18.7	22.1	24.7
Bulk density, gm. per ml.....	2.67	2.89	2.58	2.53
Lb. per cu. ft.....	167	181	161	158
Apparent specific gravity.....	3.52	3.56	3.31	3.36
Cold crushing strength on end, lb. per sq. in.....	7170	>8300	>8300	5090
Permeability to air, perp. 9 x 3 in. face, 1 skin.....	0.08	0.12	0.088	0.12
After contraction, 2 hr., 2732 deg. F.	1.0 per cent	0.1 per cent	0.0 per cent	0.2 per cent
Refractoriness under load—maintained temp. test, 25 lb. per sq. in. at				
2912 deg. F.....	Failed in 11 min.		Failed in 32 min.	Failed in 11 min.
Rising temperature test, 50 lb. per sq. in.:				
Initial softening		2642 deg. F.	2804 deg. F.	2660 deg. F.
Rapid softening		2768 deg. F.	2930 deg. F.	2750 deg. F.
Failure		2804 deg. F.	3056 deg. F.	2912 deg. F.
Thermal shock resistance, No. of re- versals	30+	7	2	3

TABLE II—Grading and Chemical Analysis of Typical Fettling Materials for Basic Open Hearth Furnace Bottoms

Grading BSI Sieves	Nearest Equivalent —Tyler Sieves	Magnesite, Coarse (Per Cent)	Magnesite, Fine (Per Cent)	Dolomite (Basic), Coarse (Per Cent)
1/2 in.-1/4 in.	1/2 in.-1/4 in.	7.5	...	36.9
1/4 in.- 7 mesh	1/4 in.- 8 mesh	13.5	8.5	28.4
7- 25 mesh	8- 28 mesh	47.5	22.5	18.4
25- 72 mesh	28- 65 mesh	25.0	17.0	7.3
72-150 mesh	65-150 mesh	5.0	13.0	2.3
Through 150 mesh	Through 150 mesh	1.5	39.0	6.7
Chemical Analysis				
MgO		82.8		37
CaO		3.2		55
Al ₂ O ₃ + Fe ₂ O ₃		8.4	as for coarse	4
SiO ₂		25.4		3
Loss on ignition		0.2		1



Fig. 2—Fettling basic open hearth furnace banks.

tion between grading and packing density will be discussed in more detail in the later section dealing with induction furnaces, where it will be shown that the fine fraction not only helps to give a high packing density but also virtually controls the sintering of the material.

With magnesite hearths, also, the use of relatively coarse batches has been normal though much improved results have been obtained by material ground to a grading of the brick batch type. Almost all the well known magnesites have been successfully used in hearths and even where dolomite is used for the hearth proper, magnesite tap holes are often employed.

For fettling, calcined dolomite is the most commonly used material and again the grading tends to be very coarse—material as large as pigeons' eggs being specified in some plants. In the United States a great variety of fettling materials are employed according to the geographical position of the plant and the particular furnace under consideration. Thus, raw dolomite is often found good enough for the fettling of banks, but for more serious work a semi-stabilized dolomite made by adding from 5 to 8 per cent of iron oxide to the feed to a rotary kiln is preferred, while serious holes in the bottom are usually repaired with magnesite either of the low or high lime type. The fact that in Great Britain dolomite is generally preferred to

magnesite is doubtless due to the "basic" being produced close to the plants where it is used and at a very much lower price than magnesite. The latter is usually only employed where "dead-soft" steels are being manufactured.

In grading fettling material it must be borne in mind that it must possess other properties than high packing density and good ability to sinter. Thus, ideally the material should leave the shovel readily, show minimum segregation and rest at a steep angle on the banks. Certain positions in the furnace cannot be fettled by hand throwing, much less by the machine fettling widely used in the United States. The material must be placed on an iron spoon and dropped in position in the manner illustrated in Fig. 2.

Most of the wear on a new bottom occurs at the slag line, but as a hearth gets older the bottom proper requires more patching. A consumption of "basic" of approximately 50 lb. per ton of steel produced, is considered satisfactory. If the slags used are thin, the refining period long, or dead soft steels being made, more excessive wear and higher fettling costs will be experienced.

(C) LIFE AND CAUSES OF FAILURE:

The life of a bottom varies from about 2 to 17 years. It may be extended almost indefinitely by efficient patching and fettling, but

after a certain period the amount of dolomite or magnesite required for this purpose increases considerably and it is more economical to tear out the bottom and install a new one. In some British plants it is considered good practice to remove the bottom every two or three years rather than wait until it shows signs of serious trouble. The wear on the hearth depends greatly on the efficiency with which it is drained and this depends not only on the shape of the furnace, but also on the temperature maintained after tapping the metal. Wherever possible metal should be splashed out of holes and never covered by fettling since the former is likely to lift during subsequent melting and oxidation and start a really bad hole in the bottom. Tap holes are generally renewed much more frequently, the tap hole proper and a patch of about 6 ft. square adjacent to it usually being replaced every six months. Selected analyses of the slags responsible for the cut at the slag line are given below:

	300-ton tilting furnace	80-ton cold pig fixed
SiO ₂	9.0	12.5
Al ₂ O ₃	1.5	2.0
MgO	6.5	6.5
TiO ₂	0.5	
Fe ₂ O ₃	5.5	11.0
MnO	7.0	5.0
P ₂ O ₅	16.0	5.5
V ₂ O ₅	1.5	
FeO	7.5	8.0
CaO	44.5	48.0
Cr ₂ O ₃	0.5	
S	0.15	

Examination of used dolomite bottoms shows that they absorb a
(CONTINUED ON PAGE 106)

20,000 Shells

By FRANK J. OLIVER

Machine Tool Editor, *The Iron Age*

a Day By

General Motors

GENERAL MOTORS has built a new plant at Lansing, Mich., and has equipped it with the latest types of forging machinery and machine tools for producing 75 and 105 mm. shell on a high production basis. The layout is extremely compact and the plant is completely conveyORIZED, with all work in process "floating" on overhead conveyors. The first part of the article describes the methods and equipment used for forging the shell.

GENERAL MOTORS' shell plant at Lansing has been laid out with these objectives principally in mind: Low unit cost, obtained through the use of the latest types of mass production machinery; "line" production methods and complete conveyORIZATION from start to finish, with a minimum of manual handling between conveyor carriers and machines; and the use of double set-ups or standby equipment in the few places where a single machine in the line, ordinarily able to keep up with production, would become the bottleneck should it fail in service and need extensive repairs. The plant was originally intended for the production of forgings for the Oldsmobile and Pontiac divisions, but before all the equipment could be installed for this purpose the whole set-up was modified to take care of production of 75 and 105 mm. shell, both forgings and machinings, at the rate of 20,000 a day on a three shift basis. Stock comes in the form of 18 ft. bars on one side of the building and the

product leaves packed in cartons at the other.

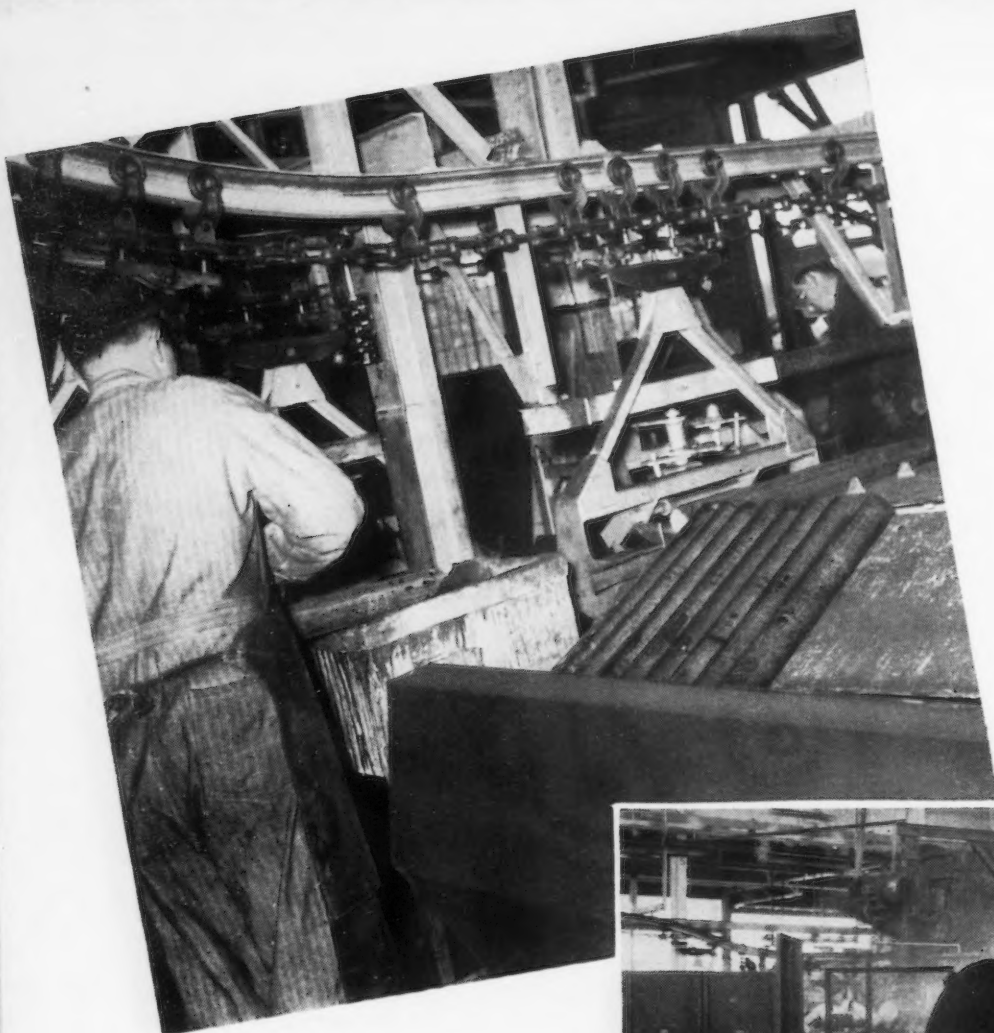
There still remains, however, productive capacity in the form of steam hammers, forging presses and heat treating equipment to forge crankshafts, steering knuckles, knuckle supports, knuckle arms and differential side gears for the automotive divisions. Besides, practically all the upset forging equipment for shell will be readily convertible to produce automotive forgings when the emergency is over, and a great deal of the machine tools installed for shell turning can be converted to machining such items as cluster gears, bevel pinion shafts and similar transmission and rear axle parts. The plant and equipment are all new and it is officially known as the General Motors Forge Plant (Division of Olds Motor works). It is located just across the tracks from the Fisher Body Plant.

Shell bar stock, which is SAE X1340 steel, for 75 mm. shell and SAE X1335 for 105 mm. shell, is

stored in the open under an overhead bridge crane and is unloaded directly from gondola cars on a railroad siding. Bundles of bars are brought to short, live roll conveyors extending through the forge shop wall and after being brought inside the building the bundle bands are broken and the single bar is rolled onto power driven feed rolls for the two shears. If necessary to assure a clean cut, or to avoid a brittle fracture, the bundle of steel is placed in a gas fired pit by the crane before it is brought in. This pit raises the temperature to about 200 deg. F. Most heats of steel do not require this heat but are sheared cold.

Two shears are used for this first operation, although one is ample for work. The larger machine is capable of shearing a 7 in. bar cold although the stock for the 105 mm. (4.14 in.) shell is a 3 in. bar and for the 75 mm. (2.95 in.) shell is a 2 $\frac{3}{8}$ in. bar. A smaller bar shear stands alongside for emergency service. The big machine was selected primarily to handle future automotive stock and as will be seen later three of the upset forge machines are of 6 in. size for the same reason.

From the shear a short slat conveyor brings the billets to an inclined rack from which they are re-



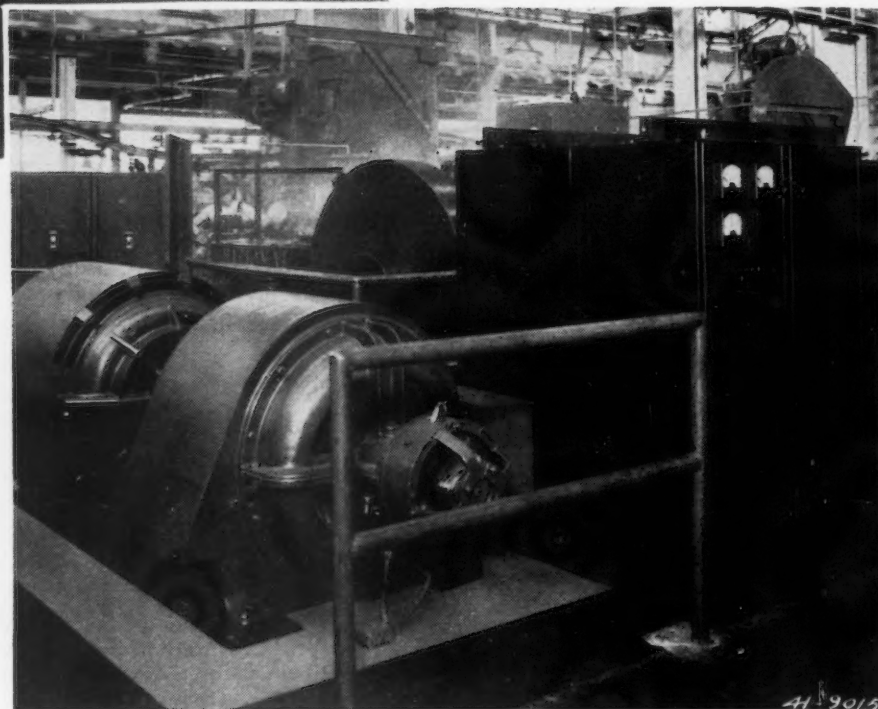
ABOVE

INSPECTION of bar stock after shearing includes polishing the sheared ends of the two end pieces of the original 14 ft. bar and etching to reveal possible pipes and seams. The monorail conveyor in the background carries billet stock to the hot forging machines.

RIGHT

POWER for the high frequency induction heating furnaces is supplied by an M-G set of 600 and 400-kva. capacity for the 105 and 75 mm. shell forgings respectively. Switchgear for the 4160-volt primary is at the right, while part of the battery of heating furnaces may be seen at the left rear.

leased in batches of three (105 mm.) at a time to a carrying cradle suspended from an overhead monorail, the first of many in the production lines. Before the middle billets are released, the end billets have had a polishing on the sheared ends, and an immersion in 50 per cent hydrochloric acid bath for 10 min. Government inspectors check the etched ends for pipe and seam



before releasing the bar to the conveyor.

From here the embryo shell begins its first journey on an overhead monorail conveyor. In the shell lines there are 13 such conveyors, each of different length and with different types of carrying devices suspended from the hooks. Two serve the forging department and are common to both sizes of shell, while six conveyors serve the 75-mm. shell machining lines and five, the 105-mm. machining lines. On the first conveyor, for example, three 105 mm. billets or five 75

mm. billets are carried at a time in a horizontal position in a cradle which has separate drop bottoms. This conveyor serves a battery of eight forging machines used for shell work. Stock chutes are placed at convenient intervals on this line and the billets are dumped automatically by cam trips and roll to the upset headers.

Forged by Upset Method

Forging of shell is done by the displacement piercing method in upsetting type forging machines using multiple cavity dies. The method itself has been described in detail in *THE IRON AGE*, Jan. 16, 1941, pp. 25-28. For shell work General Motors Forge has assigned three 6-in. and five 4-in. forging machines. Each machine has six die

cavities and five piercing and one heading tool, the work being transferred by hand from cavity to cavity progressively. In the process of piercing the hole in the shell the metal is expanded so that for the 75 mm. shell a forging $3\frac{1}{8}$ in. outside diameter and $2\frac{1}{8}$ in. inside diameter is produced from a billet $2\frac{3}{8}$ in. in original diameter. Similar proportions prevail on the 105 mm. shell. When the billet is placed in the fifth cavity, a ring that has been formed at the open end of the shell is trimmed off. The shell cavity is finished so closely to size that

no further internal operations are required except removal of scale by shot blasting and nosing in, boring and threading the open end.

Induction Heating Used

Heating of the billet is done one end at a time in coreless induction furnaces of special design. The 6-in. upsetters are served by six such electric heaters and each 4-in. machine by a bank of five heaters. Although first cost of this equipment, with all its auxiliary apparatus, is high, it was selected because of low unit heating cost, short time cycle, freedom from scale and hence longer life of the forging tools and less down time for changing tools. In induction heating, the cycle frequency is a factor governing the rate of heating and the surface effect. The higher the frequency, the greater do the induced eddy currents tend



ABOVE

FORGING of shell is done by the displacement piercing method in upsetting type forging machines using multiple cavity dies. Two shells are forged from each billet, one at a time. One of the battery of high frequency induction heating furnaces may be seen at the right.

LEFT

CHECKING duplicate sets of piercing tools used in the hot upsetting of 105 mm. shell forgings at the General Motors Forge plant of the Olds Motor Works Division.



to concentrate near the surface. Therefore, for heating bars of large diameter, the lower frequencies are to be preferred, say 1000 cycles per sec. But since the same heating equipment will later be used for automotive forgings, headed from bars as small as 1 in. diameter, a compromise was effected by establishing the frequency of the alternaters at 1920 cycles.

The 105 mm. shell calls for extremely powerful electrical appara-

tus. Each bank of six heaters, which are operated in parallel, is supplied with energy from 600-kva. alternaters driven by 900-hp. synchronous motors connected to the line at 4160 volts. Time of heating to reach a forging temperature of 2350 deg. F. is 4 min. For the 75 mm. job, 400-kva. alternaters are used, driven by 600-hp. synchronous motors, and the heating cycle for the 2 $\frac{3}{8}$ in. billets is 2 min. and 20 sec. With a battery of five

heaters, this means one small billet will be available for forging every 23 sec. For the larger billet the corresponding time is 40 sec.

One of the advantages of this type of equipment is that there is little or no appreciable heat loss and hence little operator discomfort. Billets are charged in refractory tubes which are not much larger than the stock and which have nickel-chrome wear strips on the bottom. Induction coils themselves

are made of copper tubing and are water cooled. The whole furnace is well insulated so that practically all the energy goes into heating the work.

Efficiency of heating is 0.22 kw.-hr. per lb. of metal to raise it from room temperature to 2350 deg.

It has been mentioned that the bars are sheared into billets of a length to make two shell forgings. After one end of the billet is heated and the first shell is forged, this finished piece is trimmed and removed from the bar in a mechanical press alongside the hot header. Since some heat will have been conducted into the unforged billet end, these crops are stacked vertically in a water tank with the cold end in water. This equalizes the temperature before the short ends are heated for the second set of forgings. Otherwise, the end near the crop may become overheated and even melt. This method permits crops to be reheated in a short time and the heat is so conducted out of the bar that it is not necessary to vary the power factor or the heat time. It should be explained at this point that the control of heat input is by varying the amount of power input and by automatic timers on each heater. The time cycle is initiated by manual push button, and as each billet is pulled out, the button is pushed on the heater for the fifth or sixth blank. These timers are vernier set and are mounted on the backs of the heaters.

Powerfactor High

These induction heaters are provided with two instruments on the front panel of the set, namely a power meter reading in kw. and a powerfactor meter. The synchronous motors on the M-G sets tend to offset any induction loads in the plant and bring the overall powerfactor to nearly unity. On the high frequency end of the unit, capaci-

tors are introduced to bring the powerfactor to somewhere between 0.90 and 1.00. On the big heaters power per heater is 100 kva. and on the smaller, 80 kva. Potential normally is 400 volts. It will also be possible on future automotive parts to heat any section of the bar desired by changing the taps on the induction coils. It can readily be seen that the system of heating is extremely flexible and is capable of wide application to other than shell forgings. In fact, the powerfactor meter is chiefly useful in setting up the equipment for a new job.

Billets are handled between the heaters and heading machines by tongs and counter-balancers on an individual overhead monorail serving each machine. From the trimming press the shell forging is placed in a bucket holder suspended from power driven monorail conveyor No. 2 parallel to the first and one of the longest in the plant.

Each carrier holds four shell forgings, which are lifted off the back side of the press to avoid backtracking. Billet crops go to the tank at the left as previously indicated. In trimming the second shell of the stock, a small necked down piece is removed as scrap and tossed in a skip box. This piece will be used for a small gear blank, so the only real scrap piece produced is a trim ring at the open end.

Conveyor 2 carries the shells to the shot blast machines where the cavities are cleaned of scale. There are six shotblast machines in this area, two for the 105 mm. shell and four for the 75 mm.

Each blast table has four pockets in which shell is dropped open end down and a hinged weight is swung over the shell to keep it in place. Shot is directed into the cavities from underneath through nozzles which are mechanically oscillated so as to scour the entire wall

surface of the cavity as well as the bottom. This shot blasting operation takes from 50 to 60 sec. per shell. Two monorail conveyors take the shell from here to the machining sections. Conveyor 3 carries 75 mm. shell, eight to a carrier, and conveyor 9 transports the 105 mm. shell to its separate machining area.

Capacities of these conveyors 3 and 9 are 3920 and 2364 shell, respectively, or a total float of 6284 shell. This is the equivalent of a full shift's production on the upset forging machines. In fact, these particular conveyor lengths were determined not by distances between machinery but in order to give sufficient "float" between operations. Conveyor 9, for example, to gain length without wandering has a few "accordion pleats" in it all over the shop. This system provides considerable elasticity between production rates of forge and machine departments which obviously cannot be balanced exactly. In fact, the layout at Lansing is based on the plan of operating the forge shop three shifts and the machine department two full shifts and a partial third shift. Stock in process will rise and fall as between the two departments but will always be in float on the monorail conveyors mentioned.

These two conveyors deliver their respective cargoes to the battery of centering machines for the first machining operation. Conveyor carriers from this point on are comprised of welded sheet steel buckets in which the shells are dropped, open end out, with axis at about 35 deg. to the horizontal. In this way they can be pulled out with one hand and dropped in an easy motion down over the locating mandrel on the centering machines.

(In the concluding part of the article shell machining at General Motors Forge plant will be described.)

Protection for Aluminum Castings

ALUMINUM castings are readily attacked at low temperatures by condensation of water vapor. In order to prevent this a protective coating has been developed. According to Glyco Products,

Inc., Brooklyn, it has been found that an emulsion of paraffin wax and Flexo Wax C, made with diglycol stearate S, can be applied easily to the castings by spraying in the cold, leaving a film of water-

repellent wax which protects the metal parts completely. This emulsion has also given very satisfactory results on extruded parts, aluminated sheets, zinc and tin plated parts.

Controlled Brazing of Copper

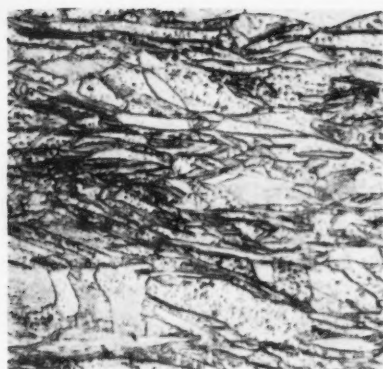


FIG. 1—Section of hard rolled copper, 1/16 in. thick, showing uniform grain structure. Magnification 200 x.

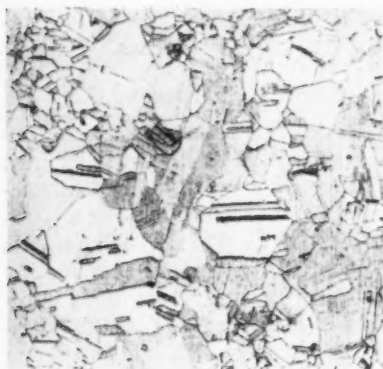


FIG. 2—Section of annealed copper, 1/16 in. thick, showing coarse and irregular grain structure. Magnification 100 x.

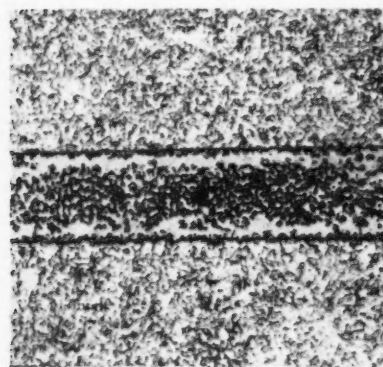


FIG. 3—Transverse cross-section of Tempobrazed lap joint in 1/16 in. copper, showing uniform film of brazing alloy and the fine grain of the adjoining metal. Magnification 100 x.

ONE of the difficulties of brazing copper and other non-ferrous metals is the softening of the material due to tempering in and around the joint. When cold worked, copper has a fine uniform grain structure as shown in Fig. 1, and develops a tensile strength of over 60,000 lb. per sq. in. When the material is softened by tempering, however, the grain structure will be coarsened and the tensile strength reduced to less than 40 per cent (Fig. 2). The temperature required to flow hard solder or brazing materials, now commonly used, usually exceeds the range which, if maintained for an appreciable time, effects a change in the grain structure of the pieces being joined. Under usual methods of brazing, there is no practical way to control the temperature and the time interval with sufficient accuracy to avoid the possibility of altering the grain structure.

R. L. Briggs of Thomson-Gibb Electric Welding Co., Lynn, Mass., in cooperation with Handy & Harman, Bridgeport, Conn., has developed a method of controlling the

time-temperature variable in order to prevent grain growth and in consequence loss of hardness. The process is called Tempobrazing (U. S. Patent No. 2,223,312) and it employs in a special brazing machine closely controlled current and a solder of low temperature flow. Amount and time of heat application is controlled and the operation is performed in a resistance seam welder with suitable means of inserting a silver brazing alloy in the form of a thin ribbon between the pieces to be brazed. The work is chilled as rapidly as the joint is made. When cooled and hardened, the brazing alloy forms a thin and homogeneous film free from irregularities (See Fig. 3).

Tempobrazing has a wide field of application, covering all articles made of non-ferrous sheet metal, such as tanks, cans, boxes, boilers, tubing, etc. It facilitates and speeds up mass production. Fig. 4 shows the process of Tempobrazing the head of a copper hot water tank. The two disk shaped electrodes press together and turn the copper tank, while the brazing alloy is led in strip form between the electrodes and a high ampere current melts and welds the material together. Two nozzles provide an efficient jet of cooling water directed at the joint which chills the work immediately after heat application and prevents changes in the grain structure of the metal. In order to form lengthwise seams, on tubes for instance, the electrode disks are turned through 90 deg. and run along the overlap, brazing as they travel.

Special set-ups have been designed for other specialized applications.

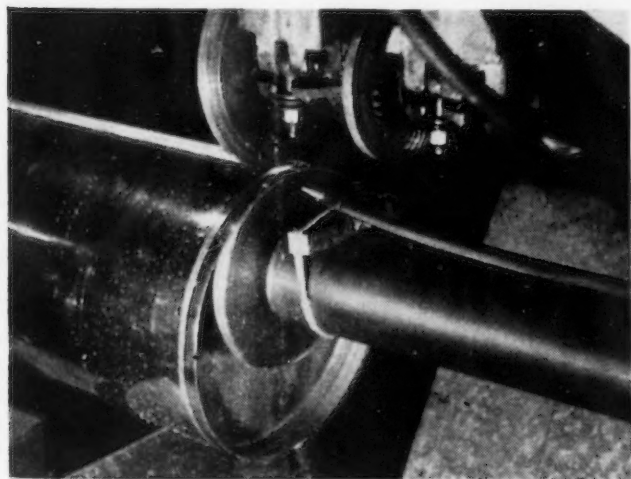


FIG. 4 — Tempobrazing the head of a copper hot water tank with a modified seam welder.

... Die-Typing to

—This important method of duplicating dies for forging, sheet metal work, die casting, plastic molding, is of great value today to speed defense work. In the first part of the article which appeared last week, the author described features of the die typing practice, steel used for dies, etc. Herein, in conclusion, data are given on draft angles, size limitations, hammer technique, etc.

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ONE particular practice in the die typing manufacturing technique is the control of surface conditions. It is essential that the die insert billet be cleaned before typing operations are begun. It is the practice to grind the top surface of the block to remove all scale and decarburized material. The block is protected while in the heating stage by any conventional method common for such a purpose. It is also protected, and this is not at all usual, while it is in the hammer.

Protection while the billet is being heated is given by covering it with a sheet metal cap, heating in a gas flame that is sulphur-free, or—on very small dies—putting the billet in a sealed tube container.

In the forging hammer, the hot billet is covered by a gas flame which completely surrounds the billet and burns over its face to prevent oxygen reaching the metal.

The greatest perfection of surface finish attained in the typing of dies has been through the use of a 0.001-in. nickel plating. This im-

provement on the basic practice calls for plating the clean die steel billet with nickel before it is heated for the typing process.

Hardness of Finished Die

The desired hardness of the finished typed die is attained by heat treating after typing, as is conventional. The practice calls for a hardness of 418 to 477 Brinell on dies for light forgings like connecting rods. For heavier forgings, hardness ranges from 321 to 387 Brinell. The stamping dies, depending upon the particular job, have a hardness of 52 to 60 Rockwell C. Hardness, of course, depends upon the kinds of steel used in the die and the kind of material being forged.

Draft Angle and Shrink

No mystery attaches to the draft angles or shrinks involved in this

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FIG. 8 — Typing an upsetter gear die in a 2500-lb. Erie hammer. The retainer block with master die insert is shown mounted in the hammer. Below is the billet of hot die steel resting in a recess in another retainer block on the bed of the press. Gas flames are kept playing across the surface of the billet to prevent scaling, and between hammer blows the work is daubed with soluble oil and water. The hammerman's helper uses air blasts to blow loose scale off the work.

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Speed Production . . .

process. Draft angles are much the same as those ordinarily applied and require only reasonable intelligence in their application.

Shrink, double or triple, as may be required by the circumstances, is based upon requirements in the finished forging. For instance, connecting rod forgings employ the regular commercial shrinkage of 3/16 in. per ft. The typing die incorporates provision for 3/8 in. total shrink and the master-master die is designed with 9/16 in. total shrink. This is typical of die typing practice.

It might be remarked here that in 95 per cent of the die typing work done, both a female master and male master (master-master and typing master) die are required. However, where circumstances dictate, only a male master is used; for instance, this has been proved possible in the manufacture of dies for ring gears and other simple shapes.

Kinds of Dies

Among the kinds of dies and molds used by industry in large quantities are the following, all of them subject to economical manufacturing by the die typing process, including some of the sheet metal stamping dies and upset dies: Forging and flash trimming dies; blanking, drawing and sheet metal trimming dies (with size limitations); cutting and shearing dies; upset dies; plastic molds; dies for injection molding; permanent molds for steel casting; dies for centrifugal casting, as for steel gears; dies for die casting; glass molds; molds for ceramics (such as for decorative brick); header dies, etc.

Size Limitations

Practical size limitations have been found to be about 2 ft. by 3 ft. For instance, a mold for a plastic steering wheel has been die typed from a billet of 24 in. o.d. In this billet an 18-in. o.d. cavity

By W. F. SHERMAN
Detroit Editor, The Iron Age

o o o

was typed. It was held within limits of plus or minus 0.0025 in. Incidentally, it may be of general interest to note that, of 102 dies typed from one master, only two production dies were scrapped.

Another example of size is the typing of a die for a camshaft 22 in. long. The billet for this insert was 28 in. in length and about 4x6 in. in cross-section.

Size of Presses

Smaller dies have been typed in punch presses of 400 to 600-ton capacity but for the manufacture of larger dies, especially those for

forging and upsetting, steam hammers of 2500 to 5000 lb. rating are used.

Hammer Technique, Timing Control

Through experience there has been worked out an accurate time-temperature control for size of the finished die. All of the billets are heated to exactly the same temperature (shrinkage is figured from the top base line of 2250 deg. F.) and the hammer man controls the final results by the length of the time he "works" the die. Thus, since it takes a large piece of steel longer to cool than a small one, the hammer operator prolongs the work on larger dies by the timing of the hammer blows to get the desired result. All of the factors are accurately plotted on a chart and the



FIG. 9—At the right are two separate die inserts "as typed" for the Ford connecting rod. These are the male master inserts in cameo-like relief just as they are removed from the retaining block after typing with the master-master (female) dies. The one at the extreme right is the finisher master die, while the one near the center of the photograph is the blocker. These would be finished up in the die shop, holes drilled around the outline of the part for venting, as described in the text, lettering such as the word "bottom" put on the die insert, and the insert would be squared up for insertion in a retaining block, as shown in Fig. 10. In this state they would be used as a single die to type the female production die as shown at the left in the "as typed" stage.

operator knows before he goes to work just what the timing must be to give him the desired results.

It appears at times that the hammer man is juggling to get the desired results, but actually he is working to the exactness of a stop watch; for instance, on a certain die he may be aiming at exactly 90 sec. to attain the desired sizing, and for that purpose he spaces the

sides squaring the bottom and machining the four sides of the trim die, is filing the cutting edges to template before the hardening operation. The time saving by this method is great compared with the standard practice in forge shops of making trim dies in sections, mounting them on shoes and doing a lot of filing and precision grinding to obtain accuracy.

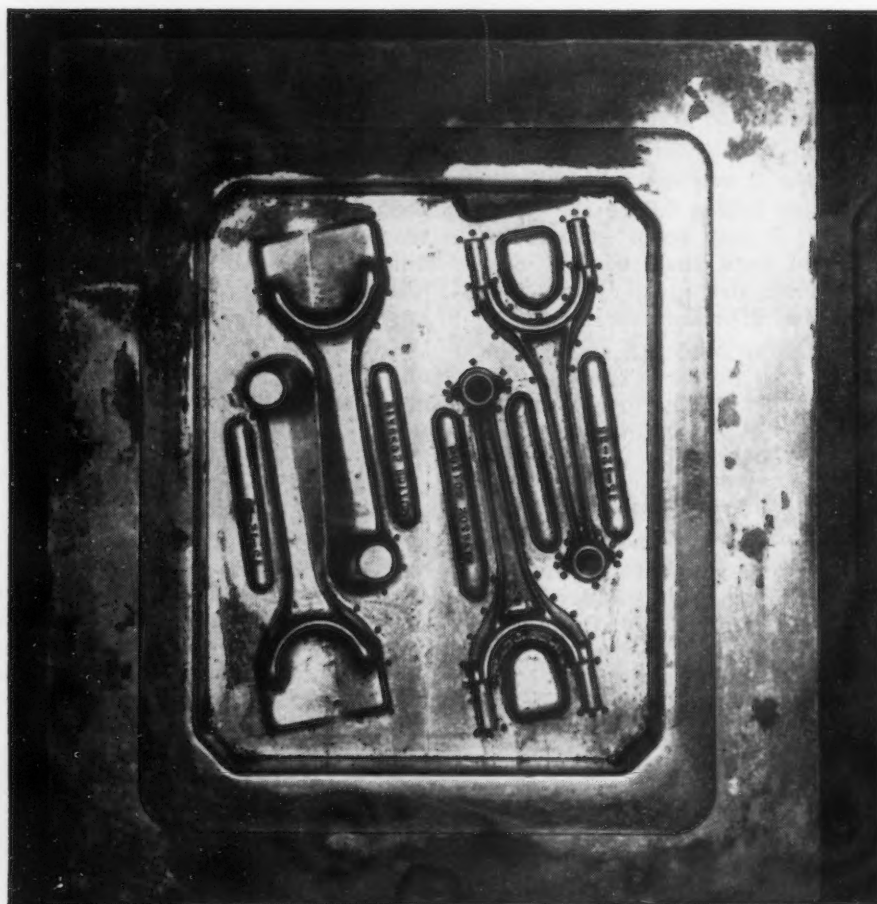


FIG. 10—This is a complete male master die in retaining blocks. It consists of the blocker die insert at left and finisher die insert at right, mounted in a single retainer block after being prepared in the machine shop and after annealing. It is ready now for use to type production die inserts, as shown at the left in Fig. 9. (As can be observed, this connecting rod design is different from the one shown in Fig. 9.)

blows far enough apart to get the final blow driven home at the instant indicated by his control chart.

Typing Trim Dies

Dies for trimming the flash from forgings are typed in a manner similar to that already described but the technique warrants special description. In this instance, the master die, or typing die, pierces the correct opening in the trim die. The only work necessary, be-

Conventional trim dies when they become dull must be removed from the press, shoe and all, and sent to the die room to have the sections removed and replaced by sharp sections while the dull ones are repaired. This involves the services of die set-up men and takes at least two hours during which the production press is idle.

Typed trim dies have considerably longer life than the conventional ones because the cutting edge

is continuous, eliminating the joints at which failure is prone to occur. In addition to being made in one piece, the typed trim dies are mounted differently. Dowel pin holes are drilled in the bottom of the trim die to serve as locating points for mounting the trim die section on the base plate. When the die is dull, it is not necessary to remove the shoe from the press. The operator merely loosens two or three clamps, lifts the die off and replaces it with a sharp one, using dowel pins for locating. The average interruption in production is only about 10 min. and no die set-up man is required for the job.

Reworking of the old section is usually done after several of them have accumulated. They are "staked in" in the blacksmith shop, or are reheated, restruck by the master die and swedged out to size; then they are filed again to template size, the bottom surface is machined and dowel holes drilled, and the dies are ready for use again whenever needed.

Time Saving by Typing

Most important feature of the die typing process is the great savings in time that can be accomplished through its use. This time saving can be translated in terms of direct cost, increased productivity of the plant, or combination of the two.

Since there is a great deal of variation in the time required to make various dies, it is only possible here to indicate the nature and amount of the possible savings.

The ordinary die probably takes an average of 5 to 60 hr. to make in the toolroom. This time depends upon the complexity of the die design and the use to which the die is put. The more complicated the die, the greater the savings in the typing method, for it is as easy to type an intricate pattern as a plain one. There is more time used on the master-master die if it is complicated, but not more than would be used in the toolroom to sink one conventional die.

On an order for 20 to 40 duplicate dies, the master-master die usually requires more time for cutting than is required to type all the other dies in the lot. On repeat orders, the time element for typing is inconsequential.

As an example, an order for 30 identical dies that ordinarily would cost 2000 man-hr. time in the toolroom for die sinking, can be done

in 24 man-hr. (three men, 8 hr. each) by the die typing method, plus time to make the original.

In die typing it is usually possible to type 30 to 40 dies in 8 hr. per typing unit. A typing unit comprises one steam hammer, two heat-treat ovens, quench tanks and a trim press. This requires the services of one hammer man and helper, and one heat-treat man.

Using the connecting rod as a typical example, it is estimated that 50 hr. are required to sink a set of connecting rod dies by the conventional method. This time element is unalterable and must be repeated for each set of die blocks that is cut during the production season. On the other hand, as many as 40 sets of connecting rod dies can be typed in 8 hr. (this means 80 die inserts) by a single crew.

In addition to the time involved in typing the die inserts, hardening them, etc., time also is involved in machining and occasionally reworking the holder blocks, etc. At a maximum, this has been found to be approximately 12 hr., about 25 per cent of the time required for dies made by the older method.

Variation in routine has made possible even greater savings. For instance, the use of double-impression dies has become widespread for small parts such as connecting rods. In a case like this no time saving is possible in die making by the conventional method, but the preparation of die blocks, placing of inserts, etc., in the die typing process takes little more time with the double-impression dies than with single-impression dies. Only 10 or 12 hr. are involved in the whole job of preparing a set of duplicate dies for use, so the actual time savings over conventional methods is approximately 80 per cent.

Life of Typed Die

As has been stated, it is possible to type dies as accurately as they can be machined or finished by hand. The surface finish of the typed dies required no touching-up in many cases, although after 50 to 75 production dies have been typed from a single type, there is generally need to do a little hand work to get corners square, etc., or some polishing of the die may occasionally be required. This touch-up work is infinitesimal, however.

The productivity attainable from a single cut die used as a master-

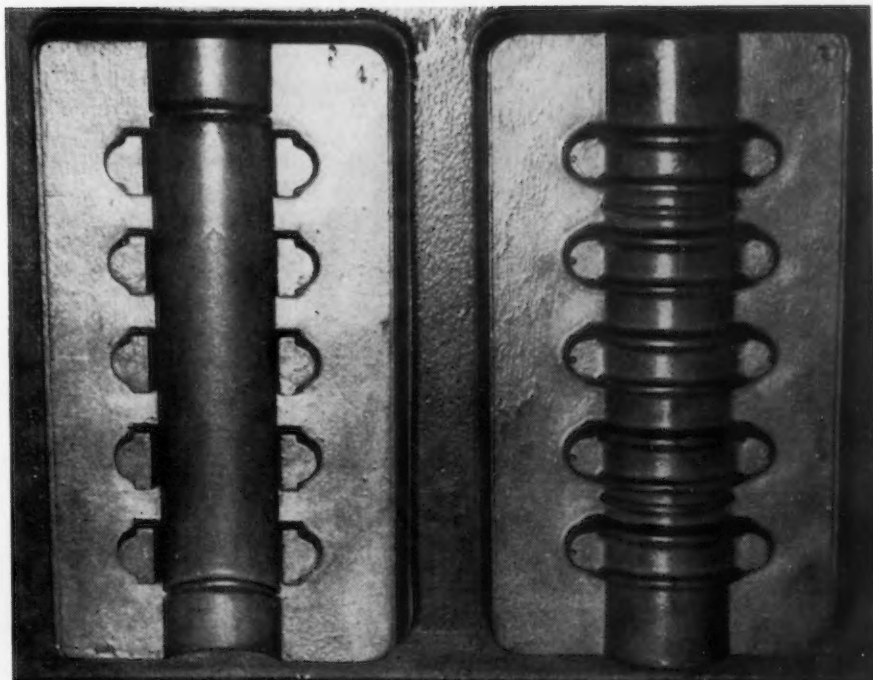


FIG. 11—A single die insert serves to produce five connecting rod caps at once. This photograph shows male master inserts for lower and upper finisher die. The inserts are shown "as typed" and before the blocks have been squared up for insertion in retainer blocks.

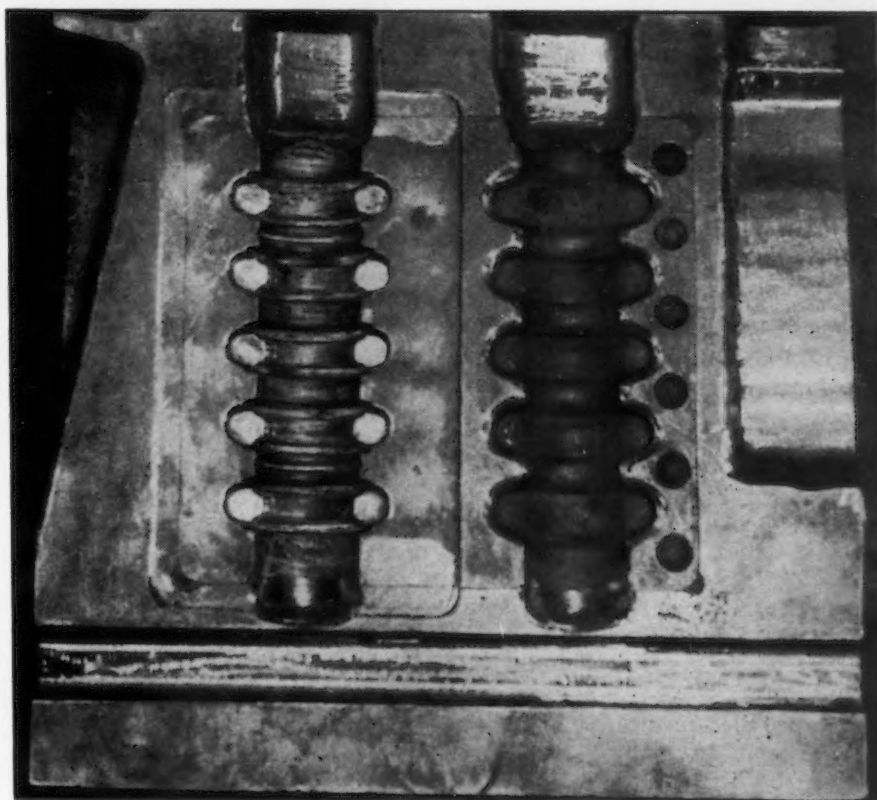


FIG. 12—This is a set of production dies for connecting rod caps now in service at the Ford Rouge plant. The inserts are for the lower refinisher (left) and blocker (right). The inserts are matched together and inserted in production die blocks. Relief at corners of insert can be seen in the photograph. The depression in the die block at the right is used to break scale and give preliminary form to the hot forging bar. Provision for cutting off the tong hold is at the upper left.



FIG. 13—Die typing is widely applied to very small dies as well as large ones. This production die is for parts made on an upsetter.

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FIG. 14—Trim die for removing flash from dual connecting rod forgings, such as are described in the text. Such trim dies are made by die typing for many trimming operations.



master die by this process has never been accurately measured for the simple reason that no production job so far has approached the maximum possible output of the master-master die.

Typed dies used in producing production forgings have given evidence that they will produce as many as 200 per cent more forgings than conventional machined dies. The average increase in production is 25 per cent to 100 per cent. Apparently the reason for the much greater production is the fact that the typed dies are subjected to a great deal of mechanical work, since they actually are forged to shape. This working of the material results in a grain flow around the contour of the die, with a resulting fine grain structure which cushions into a larger grain structure toward the center of the diestock. The die wears evenly as a result of this and does not tend to "close in" after use, nor does it have to be opened up with a pencil grinder as conventional dies do. Macro-photographs of an etched section of a conventional die, compared with an etched section of a typed die, display evidence to support these contentions.

The typed dies have the increased toughness due to refining usually associated with any forged material.

Despite the valuable contributions which have resulted from the introduction of new alloys and improved heat treating methods which give much greater die life, dies are still the most costly of shop equipment to maintain, especially dies

for forging and other hot work. Metallurgists express the opinion that the shorter life span of conventional dies is explainable by the fact that where the impression is cut into the steel block, the grain fibers are cut and the ends exposed to the continuous hammer blows.

Records on Connecting Rods

An example of increased production is furnished by records on connecting rod forgings produced with conventional cut dies, compared with those produced by typed dies. Average production from

such cut dies is approximately 6000 pieces where very close weight limits were held, after which recutting of the dies, or scrapping, is necessary because of spread and wear; typed dies on exactly the same work have averaged approximately 20,000 pieces—an increase in production of well over 300 per cent.

The records also show that a single master die has successfully typed 600 production dies, although the average number of production dies from a single master die is about 300.

In turn, the master-master die is theoretically capable of producing 300 to 600 master, or typing dies.

Even though the potential output from one master-master die has never been attained, and probably will not, the following figures are indicative of the possibilities:

One master-master die would produce 300 typed master dies; 300 typed master dies would produce 90,000 production dies (300 each); 90,000 production dies would produce 1,800,000,000 connecting rods, or enough rods to supply 1,000,000 eight-cylinder engines per year for 225 years.

The die insert holder for forging dies can be used for about 10 successive inserts. This is an important point in making comparisons between ordinary cut dies and typed dies. The ordinary cut die can be re-cut four or five times after the initial sinking. The actual measure of the cost of die steel is determined not alone by this comparison, however, but by the fact that the inserts produce two or three times as many parts in production; thus the mass of material in the die retainer block is actually useful in producing forgings in the ratio of about 30:6. In other words, any given investment in die steel may be five times more valuable in a plant using typed dies than it would be in a plant using machined dies.

The cause of rejecting these die retaining blocks is generally a spreading of the block and fatigue failure.

Specifically the extent of die life for dies made by former methods and the new typing method is illustrated by the following data: 95 sets of cut dies for connecting rods produced 541,881 forgings, an average production of 5700 forgings per set of dies; 237 typed dies produced 4,620,670 connecting rod forgings, an average production of 19,500 connecting rods per set of

dies. These connecting rods weigh, in the forged state, 1¼ lb. each, and are held to the close limit of 3 gm., or 0.1 oz. each.

Future Possibilities

The die typing process and the sensitive technique and control of temperature and size that have been developed in connection with it have untold and unmeasured possibilities, it is believed, in the field of production forging of such parts as bevel gears and racks, and other parts which can be used "as forged" if precision forging is employed.

The die typing process has also

been applied in making foundry mold patterns for cast steel pistons. The piston molds are made in nitrided steel patterns which are formed by the typing method. Iron patterns were used at first, but the patterns wore so much that the size of the piston could not be maintained. Production life of a single steel pattern is sufficient to produce 1,125,000 pistons. At this point, wear, caused by abrasion of sand, is sufficient to require repairs or replacement.

Other dies which have been used in large quantities—and indicate possible further application—in-

clude upset dies for wheel spindles, spindle bolts, radius rod ends, steering sectors, axle hubs, axle shaft gears, pinion gears, oil pump gears, transmission gears, transmission cluster gears; trim dies for connecting rods, radius rod ends, axle hubs, universal joint halves, radius rod yoke and ends, steering arm, main bearing cap; forging dies for connecting rods (forging and restrike) connecting rod caps, wheel spindle, camshaft, valve, front axle (ends), ring gears, wheel hub; plastic molds for steering wheels, distributors, distributor covers and rubber door bumpers.

Torque Tube Flanges Made From Strip

THE flanges on the torque tube that are bolted to the differential end and to the universal joint at the transmission end to hold the tube in alignment in Buick motor cars are made by a new method developed by Buick Motor Division, Flint, Mich.

Formerly made on upsetters, these flanges are now made from disks of heavy gage strip. The disks are blanked, a hole punched in the center and broached out slightly, and the disk is then forced down over a polished high speed steel ball, extruding the required collar on the flange for subsequent welding to the torque tube.

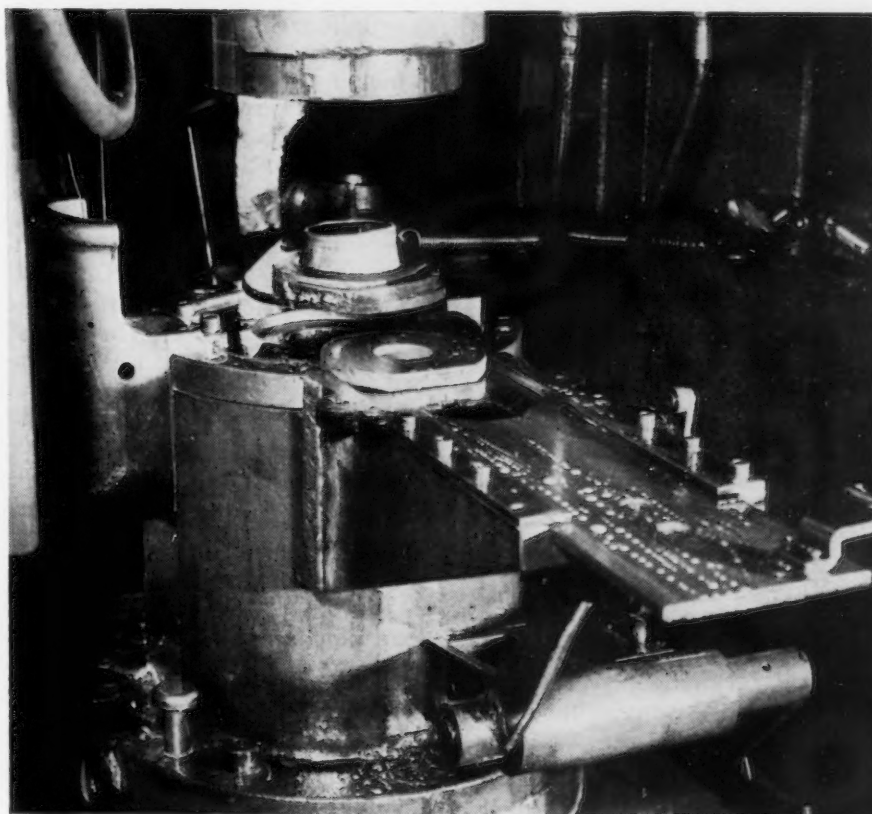
There are two sizes of flange made in this manner, the larger, for the transmission end of the tube, of 9/16 in., low carbon steel stock, the blank being 6 in. in diameter with a 1⅞ in. hole. This hole is expanded to 3⅞ in., and a 1⅜ in. collar extruded on the flange. The small flange, used on the differential end of the tube, is blanked from 7/16 in. stock, blanks being 4 in. in diameter with a 17/32 in. hole, broached to 9/16 in., and then ball formed to 1 9/16 in.

The disks are blanked from strip stock on a 600-ton clearing press, broached on a 6-ton American broach which enlarges the hole to the required diameter, and are then placed in a Williams & White 500-ton hydraulic press, where, by forc-

ing the disk over the steel ball, the hole is expanded and a collar extruded on the flange.

As the balls are forced through the blank, they roll down a chute which feeds them back on the center post for subsequent operations. As the dies open, a swinging arm, pivoted at the rear of the lower die,

moves horizontally to remove the formed piece from the dies. The press ram travels about 15 in., and production averages about four pieces per min. In making the large flange, four balls are used in the chute, while seven balls are used in the small flanging operation.



THIS swinging arm is removing one completed flange, while the disk for another is ready to slip into place for the extruding operation.

How to Choose D.C. Arc

TO help prospective users select the right d.c. arc welding equipment (assuming that to be the initial choice), and to point out to present users how they can get the most out of their apparatus, three points of view are brought out in this article: that of management, of the welding foreman and the point of view of the operator. In the first part of the article, the operating characteristics of single operator motor-generator sets are discussed. In a later article, problems connected with multiple operator motor-generator sets with individual resistor stations will be treated.

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IN selecting single operator arc welding equipment, management is faced with the problem of satisfying the personnel of the welding shop that they have been given the right tools with which to work and at the same time of overcoming prejudices built up on misinformation and pseudo-scientific bases of selection that have grown up around this type of machinery. It is necessary therefore to have assurance that a selection based on shop personnel preference will not result in welding sets having excessive capacity, undesirably high maintenance, expensive gadgets that add nothing to productive ability, or equipment which will foster waste and inferior workmanship, either through inherent deficiencies or through difficulty in proper adjustment.

The single operator, self-regulating direct current arc welder has become the general purpose machine of the arc welding industry. It is an excellent example of highly specialized design to meet peculiar electrical operating conditions. Since the performance required from a single-operator welder is very different from that required of a generator of conventional design, and since there are many methods of varying effectiveness by which this performance may be more or less successfully obtained, some consideration of the requirements of a successful single-operator generator should be given by everyone concerned with its selection and use.

Perhaps the most obvious characteristic of single operator welders is the fact that short circuit currents are limited to harmless values, whereas with ordinary constant potential generators without current-limiting resistors the short circuit current might be so high as to be disastrous from the welding point of view. The single operator welder is basically designed to limit short circuit current by the self-regulating characteristic or drooping voltage characteristic through which an increase in current results in a decrease of voltage, thus limiting the current which will flow at a given voltage. Typical volt-ampere characteristic curves, plotted to show the relationship between terminal voltage and line amperes, are shown in Fig. 1.

Any machine of the self-regulating type may be short-circuited without damage to the machine, and after the short-circuit is removed the normal circuit voltage will again appear across the machine terminals. But in welding, the important thing is how fast it will come back. This can be shown only by studying the dynamic or transient characteristics of the machine by means of oscillograms. Likewise, the fact that the maintained short-circuit current of the machine is limited to a safe value is not enough. The quality important to really successful welding is the limitation of the peak or maximum value of the current which will flow at, and a few hundredths of a second after, the occurrence of the short-circuit. This again cannot be

learned from the static volt-ampere characteristic curve; it can be determined only by a study of the transient characteristics.

Oscillograms intended to show welding machine characteristics are made with artificial transient circuits, using controlled values of voltage, current, and time in order to give a true picture of the characteristics of the machine's design without the distortion produced by the constantly varying conditions within the welding arc. A typical oscillogram is shown in Fig. 2.

It is a very simple design problem to obtain any desired slope of a static volt-ampere characteristic curve, but it is a great deal more difficult to secure along with it the transient characteristics required for successful welding. It is for this reason that highly specialized design of d.c. generators have had to be developed for arc welding applications. Fig. 3 shows schematically the essential elements of one such design.

Control Systems

Many forms of control for single-operator arc welders have been designed, in all of which the primary objective is to limit the output of the generator. Much misinformation about the function of control schemes is current, but the basic facts are these: First, the control, depending on its adjustment, limits the output of the generator to a predetermined average value. Second, the control does not add arc stability, does not improve the transient characteristics of the generator, and does not change the fundamental characteristics of the welding arc. It is consequently true that no method of control can make up for deficiencies of the welding generator, of the electrode, or of the operator.

In the single control schemes, current adjustment is accomplished by shifting the position of the generator brushes, or by moving a portion of the magnetic field structure

Welding Equipment

of the generator. In dual control systems, two electrical conditions in the generator are varied—the shunt field strength, and the amount and direction of series field strength. Any of these methods can be used successfully to vary the power input to the arc, that is, to accomplish adjustment of the *average* welding current which will flow at a given average terminal voltage. Since their effect is to limit the generator's output, however, they may react unfavorably on its performance as a welder.

Limit to Adjustment Range

If changes in the electrical and magnetic conditions in the generator are carried too far in the attempt to get a wide range of adjustment, impairment of the all-important transient characteristics—high instantaneous recovery voltage, and limitation of instantaneous short circuit peaks—will result. For this reason, any analysis of a machine's welding performance should be based on oscillograms taken not only at rated load adjustments, but also at several additional adjustments including those for the minimum and maximum welding currents it is proposed to use. In addition, the possibility of undue heating and of poor commutation at the extreme settings of the controls should be investigated.

Because arc stability and electrode performance, such as penetration, slag coverage, and melting rate, are inherently characteristics of the electrode, no contribution to them can come from the generator control. As regards arc stability, the generator contributes in only two ways: First by limiting the average current and short circuit currents, and second by providing, instantly, the voltage required to keep the arc going. Assuming a generator characteristic adequate to perform these functions at any *average* current level for which it may be used, then the performance

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of the welding arc is a function of the electrode and the operator's technique. The function of the control is then only to adjust the average current output of the generator. Variations in the open circuit voltage, or in the position of mov-

able parts, do not affect the *electrode* performance as long as they do not impair the generator's ability to limit current surges and to provide at all times adequate voltage for the arc.

In selecting the proper type and size of single-operator equipments, the most important factors are:

- (1) Welding performance.
- (2) Adequate rating.

Welding performance is listed

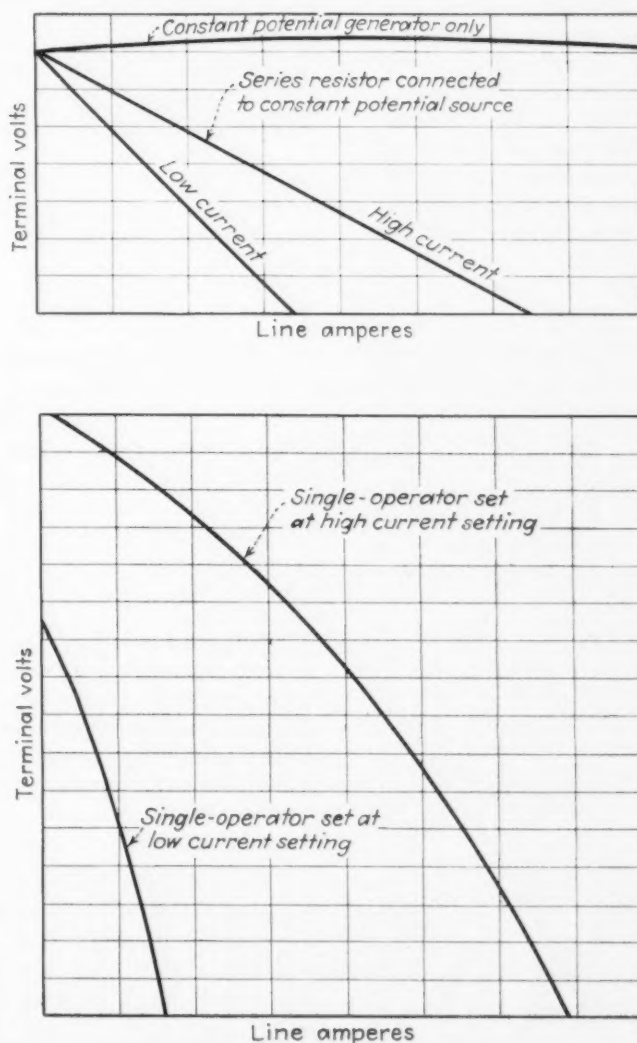


FIG. 1—Typical volt-ampere curves of d.c. generators designed especially for arc welder service.

first because it affects both the quality and the quantity of work through its effect on the operator. Not only must the machine be able to maintain a steady arc to avoid excessive splatter and arc pop-outs under ideal conditions, but it must

Duty Factor Important

For manual welding, the duty factor may range from 20 per cent to 75 or 80 per cent. At the lower duty factors, a given set may be used for much heavier work than

the arc from continuous coils, the individual periods of load may be so long as to constitute virtually a 100 per cent duty factor, or continuous operation, even though the machine may operate, say, only 4 hr. out of an 8-hr. day. Where such periods exceed 10 or 15 min. it is safe to treat the load like a continuous load at 100 per cent duty factor, regardless of the actual duty factor. In most instances such a load, measured in amperes, should not exceed 80 per cent of the rated current of the welder; that is, the set selected should be rated at least 25 per cent higher than the maximum load contemplated.

For lower duty factors, the permissible load may be roughly approximated by dividing 0.8 times the rating of the set by the square root of the duty factor. Conversely, the rated current should approximate 25 per cent more than the contemplated maximum load current multiplied by the square root

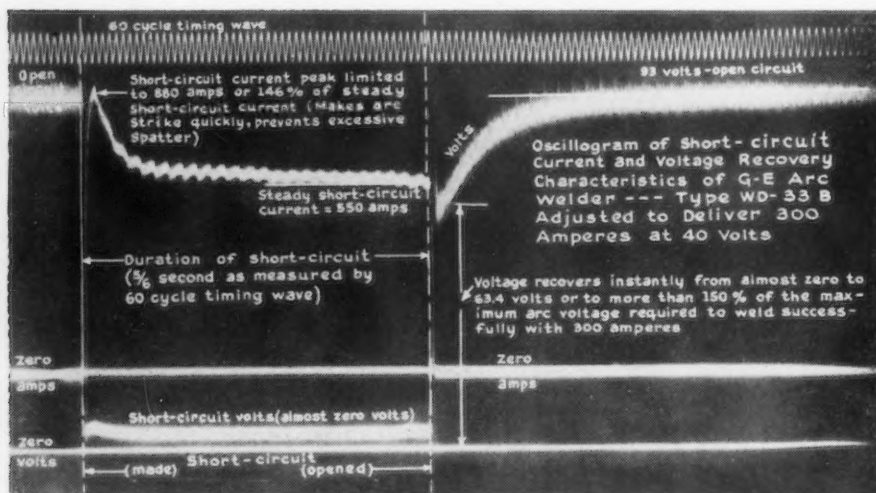


FIG. 2—Oscillogram of single operator d.c. welding generator characteristics, made with transient circuits having controlled values of voltage, current and time in order to eliminate distortion produced by the constantly varying conditions within the arc itself.

make it easy for the operator to use the proper technique for his work without suffering these annoyances. Maximum production cannot be expected of a welding operator unless he is given a reliable welding set which permits him to use his best judgment and skill in welding and which does not hinder him by requiring extra time and effort to adjust properly.

To insure proper choice of the rating of a single-operator set, the maximum current, load voltage, and duty factor (ratio of arc time to total time) must be taken into account. Except in the smallest sizes, most sets are rated on a one-hour load. Their rating is the current which they will deliver for one hour without interruption, without exceeding a prescribed temperature rise. Since this method of rating, chosen as a simple standard for comparison, does not take into account actual operating conditions, it is not always economically sound to choose the size next larger than the maximum operating current contemplated.

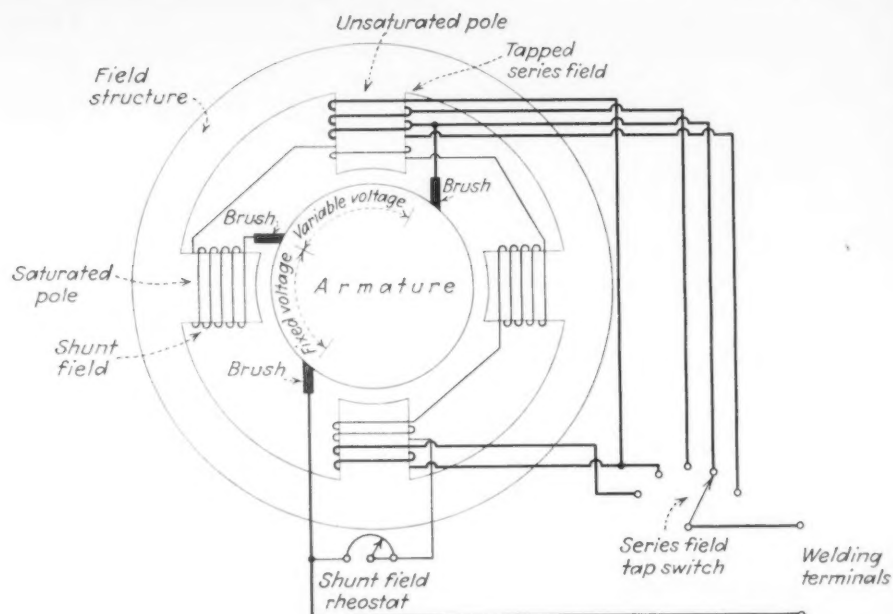


FIG. 3—Schematic design of a split-pole or two field design of high production arc welding generator. The main field generates constant voltage always available to stabilize the arc and to furnish welding current instantly. The cross field acts like a governor, automatically regulating the flow of current in the arc. This combination provides instantaneous response, enabling the operator to maintain a productive arc with ease.

at higher duty factors. Account must be taken of the length of time over which the duty factor ratio is observed. For conservative figuring a period of 10 min. is usually used. Thus a 40 per cent duty factor would mean that the unit is loaded for a total of 4 min. out of each 10. In machine welding applications, where electrode is fed into

of the duty factor. For example, a 250-amp. load at a 36 per cent duty factor would require a set rated at least:

$$1.25 (\sqrt{0.36} \times 250) = 1.25 \times 150 = 188 \text{ amp. The next larger standard rating is 200 amp.}$$

When making these calculations with very low duty factors, care

should be taken that the maximum output available from the set selected is high enough for the job. For example, figuring a 250-amp. load at a 20 per cent duty factor gives a rating of 138 amp., requiring a 150-amp. set. However, most

maximum permissible load reduced to 160 amp. if the load voltage is 50 volts.

The load voltage is the sum of the arc voltage plus the voltage drop in the leads between the set and the arc. In figuring this voltage

sight of the necessity of fusing branch circuits with fuses large enough to withstand the starting current requirements of the set. This factor involves no technical difficulties, since practically all sets are provided with motor overload protection, and only short-circuit protection is required of the branch circuit fuses. In large installations, feeders should be laid out with due regard for duty factors, no-load currents, and vectorial addition of motor currents, necessitated by the widely differing power factors at no load and under load.

The performance characteristics of various welding sets are easily seen by skillful welding operators to differ mainly in:

- (1) The ease of current setting.
- (2) The tendency toward sticking of the electrode to the work, and toward excessive spatter while welding.
- (3) The ability to maintain a stable arc under all welding conditions, particularly on joints requiring "whipping" of the electrode, when using bare or lightly coated electrode, or when magnetic blowing of the arc is evident.

The welding operator himself, in spite of these differences, has the most control over the quality of the weld metal, for he carries the responsibility of properly directing the arc, controlling the flow of slag, controlling penetration, and preventing slag inclusions and cold welds. It is to the welder's own benefit to recognize that these things cannot be done by the welding set itself—a good generator and good control can only give him a good tool to work with.

A great many false impressions about welding arc characteristics are a hindrance to many less expert welders, because they seem to prove that it is the welding set, instead of the man behind the arc, that controls weld quality. It is sometimes said, for example, that penetration can be controlled by varying the open circuit voltage of a welder; yet some operators will call for a low open circuit voltage, and others for high, for the same class of work. Actually, the open circuit voltage does not even exist while any welding is being done, as proved by the fact that voltmeters on welding sets always show a sudden drop in the voltage as soon as the arc is struck. Although different units may require different control settings to permit the use of good technique, it is not open



FIG. 4—Diaphragms for steam turbines require highest quality welds. A job like this calls for a single operator d.c. arc welder because it is a high duty factor application requiring the utmost in arc stability and ease of manipulation.

150-amp. sets will not deliver 250 amp.

Load Voltage a Factor

The load voltage on the unit is also a factor in the selection of rating. The output of a welding generator alone is limited by the heating and other factors influenced almost entirely by current, practically regardless of the load voltage. But when the driving motor is also considered, the limiting factor may be kilowatt output, embracing both current and load voltage. When load voltages are *higher* than rated terminal voltage, the maximum current calculated by the method above should be *reduced* by the ratio of the rated voltage of the machine to the load voltage. (Conversely, the approximate *rated* amperes arrived at by the method above should be *increased* in the ratio of load voltage to the rated voltage of the set.) Thus a set rated at 40 volts and capable of delivering 200 amp. maximum on a given duty cycle, should have its

drop, the return lead or work lead, should be accounted for as well as the electrode lead.

In addition to welding performance and proper rating, the electrical characteristics should be taken into consideration in planning a single operator welder installation. But minor differences in efficiency or power factor should never be allowed to outweigh the more important factors of rating and performance on the welding job. In making power cost analyses, no-load losses should always be included. On a duty factor of 40 per cent, for example, the welder or welders will be running light 4.8 hr. per 8-hr. day, and the cost of power consumed while delivering no welding current will be an important item in comparison with the power used while actually welding during the remaining 3.2 hours.

In laying out installations of single operator sets, care should be taken to provide adequate conductor, switch, and fuse clip sizes. The installing contractor should not lose

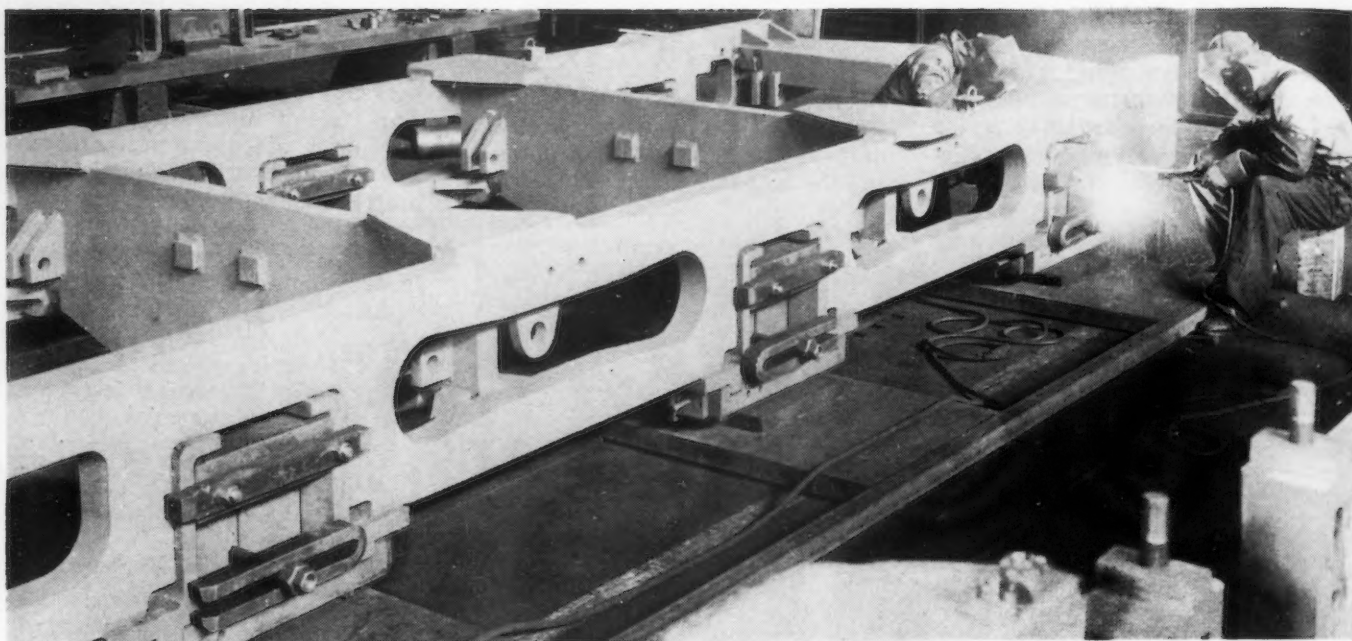


FIG. 5—Locomotive truck frames, where high quality welds must be made in all positions, call for single operator d.c. arc welders.

circuit voltage, but proper current, a good rod, and skillful technique which control penetration.

Magnetic Arc Blowing

Some welders believe that the arc produced by one type of machine is more likely to blow around, because of magnetic disturbances, than the arc produced with other types of machines. This idea probably arises from the fact that with machines having an unusually long arc-sustaining ability, pop-outs and sputtering of the arc due to severe magnetic blow are less frequently noticed than with machines having less inherent stability. The fact of the matter is, however, that magnetic blowing of the arc is produced by nothing in the welding generator itself; it is due to the magnetic field or magnetism in the work caused by the welding current passing through the steel. The magnetism attracts the arc because the arc is carrying current, in exactly the same way that the magnetism in a motor attracts the armature coils which are carrying current. A machine's ability to maintain abnormally long arcs is no real remedy for magnetic blow, and the dirty welds and poor appearance which result from it are not easily overcome. On the contrary, an excessively "rubbery" arc may permit operators who do not appreciate the bad effect of magnetic blow to continue to lay down metal under conditions which make good quality

welding impossible. The remedy, in cases of severe magnetic blow, is not to fight the blow, but to reduce it by a change in the location of the ground connection, by reducing the welding current, or by using alternating current welding.

It is sometimes thought that a change in the open-circuit voltage or rheostat adjustment can be made to change the amount of heat in the arc without changing the welding current. But while a "hot arc" may seem to result from a circuit producing excessive spatter, yet the actual amount of heat generated in the arc is determined only by the current flowing and the voltage across the arc. With the same average arc length and type of electrode, a given current, say 200 amp., will always produce the same total amount of heat in the arc regardless of the setting of the controls, or of the type of control.

When all these impressions have been boiled down, the fundamental necessities for good welding performance are seen to be independent of the type of setting of the control, provided that the ability of the generator to produce the basic necessities of a quiet, stable arc, is not impaired.

Choice of Settings

In adjusting a welder for a particular job, therefore, the manufacturer's instructions should be followed: Where more than one setting can be made to secure the de-

sired current, the operator should endeavor to find the setting which will give the best set performance from the point of view of arc stability, minimum splatter, and minimum sticking, regardless of the kind of work which is being done. It will be found that this particular setting will give the best welding performance on any type or position of joint, and permits the operator to utilize to the fullest extent his own ability to hold a good effective arc.

Operators should not, under any circumstances, shift the brushes of machines having other means of current control. Shifting the brushes will disturb the fit of the brushes on the commutator with consequent impairment of the operating characteristics, and it may result in poor commutation and excessive commutator and brush wear. In addition, the range of adjustment of the set will often be upset by moving the brushes from their factory setting.

When very low currents, below the operating range of the set, are required, they may be obtained easily by connecting resistance in series with either the electrode lead or the work lead. If a specially designed resistor is not available, any resistor having sufficient current carrying capacity and resistance may be used. In emergencies, 200 to 300 ft. of the smallest available welding cable may give sufficient current reduction. With this

connection, no impairment of welding characteristics is produced; on the contrary, such a resistor will often improve the characteristics of welding circuits supplied by sets having inferior performance at low currents. This is because the resistor makes it possible to operate at low currents without going to the extreme low-current setting of the set, at which its performance may be poor. Variations in welding current can be obtained by adjustment of the controls in the usual manner, except that currents will be lower than usually obtained at a given setting. Care should be taken not to increase the current so much as to overheat and possibly burn out the resistor.

Parallel operation of similar single operator sets can be used to obtain higher welding currents than one set will deliver. Manufacturer's instructions with regard to control settings and the use of equalizer connections should be followed closely. In general, open-circuit voltages and current settings should be kept as near equal as possible on all sets paralleled. Sets are preferably started up before the paralleling connections are made, and these connections should be broken before the sets are stopped. All sets operated in parallel must have the same polarity.

Polarity reversal of properly designed sets will not take place under normal operating conditions.

While sets are often said to have "reversed themselves," investigation will almost invariably show that the set was reversed by another. The most frequent cause is probably flashing one electrode holder against another while the sets are connected with the same work-lead or ground-lead connection. As long as the electrode holders or electrodes are not touched together, no polarity reversal will be caused by operating several sets on the same workpiece, regardless of whether the sets are operated with the same or different polarities.

Ed. Note—Next week the author concludes this informative discussion with data on the most efficient arrangements for multiple operator motor-generator sets, etc.

Finds Journal Roughness Improves Bearing Life

ONE of the important automobile producers in Detroit, name withheld, has announced that close-fitted precision parts will be artificially roughened in production, contrary to the current practice of seeking to produce smooth finishes on such metal parts. Since widespread publicity on this subject appears likely to stir up considerable controversy which will possibly center largely on the definition of terms, the entire statement as released by the automobile company is published herewith:

"A major automobile engineering change, having to do with an entirely new practice in finishing crank pins, main bearing journals and other steel surfaces subject to lubricated metal to metal contact, is under development for 1942 models, by one of the largest producers in the medium price field.

"Regarded as an outstanding advancement because of the results claimed in longer bearing life and the ability of bearings to withstand greater loads, the change will be placed in production with the beginning of the 1942 model run, following exhaustive tests in the experimental laboratories and on the road.

"According to engineers closely associated with the new development, established practice has been to machine, grind and lap crankpins to a highly polished finish on the theory that a complete and un-

broken film of oil is formed on the steel which carries the load on the bearing journal and prevents metal to metal contact and failure of the bearing.

"Such finishes, as measured by the profilometer have an average depth of surface depressions of 4 to 5 micro-in. (millionths of an inch) and in some cases go down to 1.5 or 2 micro-in.

"It is now planned to go to a rough finish of from 40 to 70 micro-in., this finish having been shown in the research program to produce a substantial reduction in bearing wear and failure.

"Artificial roughening of smooth steel surfaces has been practiced on such parts as camshafts, pistons and tappets for the purpose of etching the surface and applying a soft coating material which would have a wick action and absorb oil so that initial scuffing of moving metal surfaces would be minimized. Electrolytic, chemical and heat treatments have been used successfully in such applications.

"In the present research, after it was proved that acid etched journals gave longer bearing life than smooth journals, it was decided to build crankshafts in which the journals would have different degrees of roughness produced mechanically.

"Four of the eight connecting rod journals on a test shaft were ground with deeper grooves or scratches than the usual ground

finish showed. The other four were standard production finish. After grinding, the experimental journals were polished only lightly with abrasive cloth. The shaft then was assembled in a motor and given an endurance run.

"After tearing down the motor it was discovered that the rod bearings on the 'rough' journals were in much better condition than those on the smooth journals. This result was checked by varying the position of the 'rough' journals on other shafts but the conclusions were the same in every test.

"More endurance runs established a tentative surface roughness range of 40-70 micro-in. as the optimum. So convincing and uniform were all tests that it was decided to specify this range as the production standard for all crankshaft journals, both pins and mains. Such shafts already have been used extensively for a thorough test in production cars.

"Theory of the improvement in bearing life shown by actual tests is that lubrication is improved and consequently operating temperatures are substantially reduced."

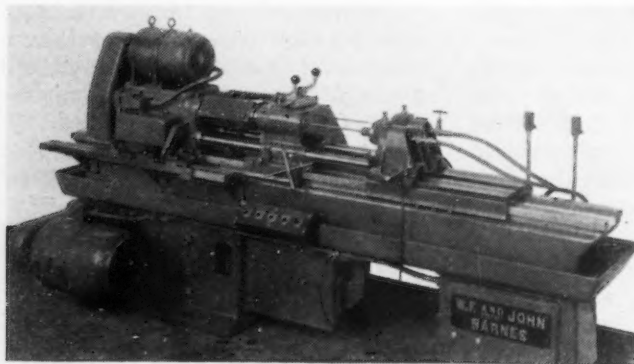
[EDITOR'S NOTE: A similar practice is known to have been investigated and used in a limited way by a major airplane producer and is also under investigation by one of the automotive research laboratories. In these instances, however, the process is described unofficially as one that results in smooth surfaces, but with controlled depth scratches, or grooves, that act as oil reservoirs.]

New Equipment . . .

Machine Tools

Some of the latest additions to the field of machine tools are here described: horizontal drilling machines, broaches and burring machines, gear shavers, grinders and buffers, precision lathes, millers and screw machines.

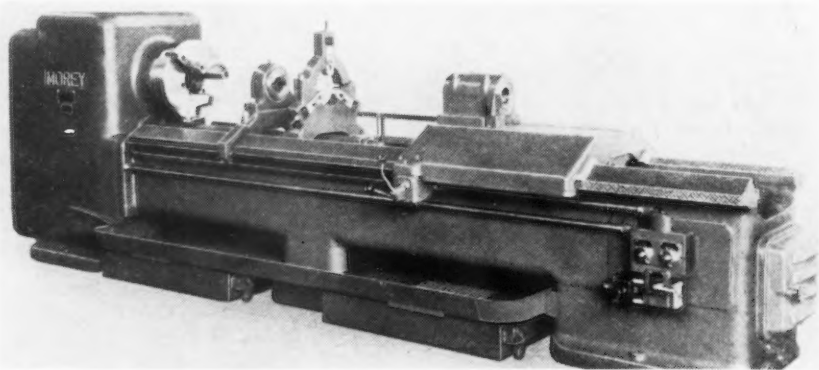
RIFLE barrels up to 0.50 caliber and deep hole drilling of diametrically balanced parts, such as crankshafts and cams, printing press rolls, boring bars, etc., are facilitated by the new 410 rifle driller of *W. F. & John Barnes Co., Rockford, Ill.* The two spindle, hydraulically actuated headstock is mounted on 10-in. ways. Spindles are mounted on antifriction bearings and driven directly through V-belts by a 3-hp. 1800 r.p.m. motor, mounted on top of the unit, at speeds from 1000 to 2000 r.p.m., changed by the replacement of sheaves and belts. Tail and headstock are coupled by two ground tie-bars. A retractable quill is provided for each spindle, individually actuated through rack and pinion with cam lock. The tool shank is received by tool holders which can be moved separately to accommodate variations in tool length, and a torque overload protector is provided which automatically returns headstock to starting position should the torque exceed a predetermined maximum. A pilot light warns which tool is overloaded. The coolant filtration system has been most carefully designed. Hydraul-



lic actuation imparts a positive feed to the barrels and drills feed through the last fraction of the cut.

Horizontal Drilling Machine

IN two models *Morey Machinery Co., Inc.*, 410 Broome Street, New York, supplies a horizontal



drilling machine to produce two holes simultaneously from $\frac{1}{2}$ to $1\frac{5}{8}$ -in. diameter with a standard drilling length of 76 in. The drill on model D is fed through a hydraulic cylinder from $\frac{3}{8}$ up to 2 in. per min., with a power rapid traverse 50 in. per min. Model DS is equipped with a screw feed actuated by a hydraulic motor from 0.001 to 2.3 in. per min. and rapid traverse up to 200 in. per min. The machine

carries a self-contained motor driven headstock arranged for V-belt drive. The pulley in the rear of the machine drives a pair of spiral pick-off change gears at the front. The drive is then transmitted through a pair of

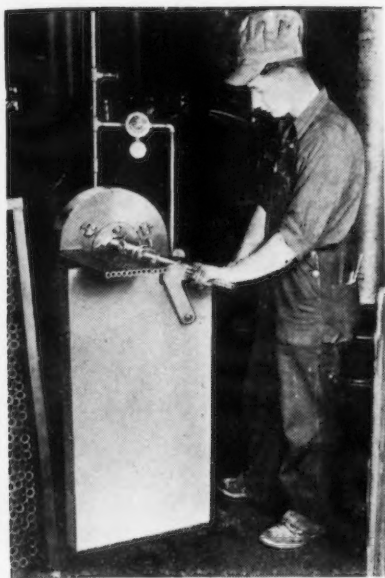
hardened spiral bevel gears to helical gears mounted on the spindle close to the front taper roller bearings. The bed is made of two inverted V-ways with heavy ribs. Spindle speeds range from 145 to 600 r.p.m., variations are effected through pick-off gears. The main driving motor rates 10 hp., hy-

draulic feed 2 hp. and high pressure pump motor 5 hp. at 1200 r.p.m.

This maker also produces a 27-in. deep hole drilling and reaming machine for boring 155 mm. gun recoil cylinders. It is built to any length to suit requirements. Spindle speeds to suit are obtained by pick-off gears. Feed and power traverse are hydraulic and infinitely variable from $\frac{3}{8}$ in. to 75 ft. per min. Two levers control the entire operation of the machine. For both horizontal drilling machines a coolant system is provided with safety devices which stop the machine instantly if any part of the mechanism should not function satisfactorily.

Spindle Burring Machine

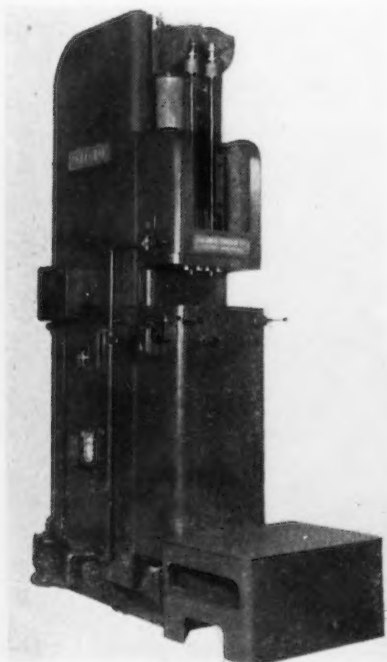
FOR reaming, burring, facing, threading or honing tubing and rods the *Pines Engineering Co.*, St. Charles, Ill., announces a horizontal



spindle burring machine. This unit has an air operated work chuck controlled by a limit switch. The switch is coupled with the feed movement lever that advances the spindle. High speed operation is said to be due to the mechanical-electrical arrangement. Shown is a typical production set-up where three operations are performed in a single pass, tube outside diameter is burred, end faced and inside diameter reamed. Simplicity of set-up, flexibility and ease of operation and adjustability for handling a wide range of work are claimed by the maker.

Pull-Up Broaches

DEVELOPED to obtain maximum production in machining round and splined holes. *Colonial*



Broach Co., 147 Joseph Campau, Detroit, now offers a complete line of improved pull-up broaching machines ranging from 6 to 25 tons and even larger capacity, and from 36 to 60-in. stroke with completely automatic handling. The machine platen and puller brackets are unusually large, providing ample space for pulling two or more broaches at one time. Provision is made for mounting spiral broach drive heads to machine spiral splines. The hydraulically actuated automatic broach is held at the bottom of the handling mechanism by locating bushings. After placing the part in position over the pilot end of the broach, a cylinder located in the base of the machine advances the broach through the platen. An automatic puller in the pull bracket then engages the broach. The machine is loaded by dropping the part over the top pilot of the broach, and thus maximum production for this type of broaching is insured in combination with the automatic handling. A dual hand control makes starting of the broach impossible unless operator's hands are on the levers. Heavy duty large volume coolant pumps and oil level gage are provided.

Gear Shaving Machine

RED RING gear shaving machine (shown below) has just been brought out for gears up to 36 in. diameter, 2 in. pitch and having a face width up to 36 in. Here the cutting tool is driven by the work gear to eliminate high driving torque, especially where the work gear is very heavy. As the work gear drives the cutter mounted on free ball bearing centers, the torque load between the cutter and the work gear is constant and small. The cutter head is built for cross-axes settings and is provided with a sine bar adjustment. Reciprocation of cutter and work gear spindle is varied by changing pick-off gears in the work head drive. Elliptoid teeth (crown or barrel-shaped) can be formed; as the cutter is reciprocated across the face of the

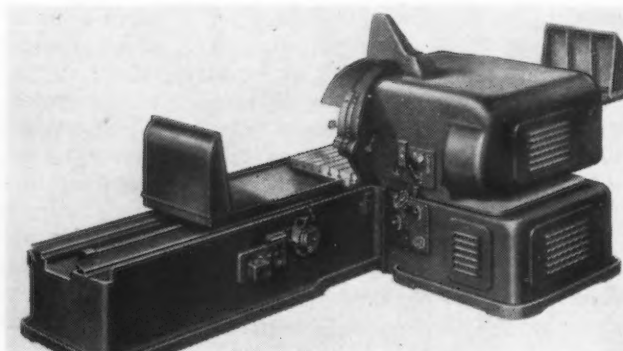
work gear tooth, the work is automatically rocked, producing a deeper cut at the ends of the tooth than at the center. The cutter head slide is adjustable for various center distances up to 50 in. Its housing is mounted on a slide which carries it in a reciprocating motion parallel with the normal work gear axis. The head itself accommodates cutting tools of 7, 9 and 12 in. diameter. The action of the entirely automatic machine is under the control of microflex timing units which, in turn, are controlled by elements on the electrical panel board in the base of the machine. Machine can also be operated manually. Ways are hardened and ground and all sliding elements are force-feed lubricated. Made by *National Broach & Machine Co.*, Detroit.

Heavy Face Grinder

INCREASED speed of production is featured by a new Philadelphia type face grinder by *Diamond Machine Co.*, Philadelphia. It is claimed that machining time can be reduced in many cases by one-quarter or one-third. All controls, instrument dial and oil filling points, have been centralized. Even at the extreme limits of travel the platen never overhangs the 229 x 48½ in. bed. The ways and platen have been widened, assuring a rigid foundation for the table and allowing for the mounting of a magnetic chuck or for grinding wider parts. The table is driven by a Hele-Shaw pump through pistons mounted in double opposed cylinders, whose rods are always in tension and uniform table speeds are assured. The wheel head of the main spindle can be rotated horizontally as much as 15 per cent for concave grinding. Thirty and 36-in. diameter grinding wheels can be fitted with speeds of 530 and 440 r.p.m., taking



work 17½ and 23½ in., respectively, with front guard in place. Length of work accepted is 84 in. The wheel is dressed by a hydraulic wheel turning device, adjustable for all positions of the wheel head.



Wet Grinder

LINE of 12 and 14-in. heavy duty wet grinders is one of the recent developments of the *Standard Electrical Tool Co.*, 1946 West 8th Street, Cincinnati. This machine has a wet grinding hood with integral splash bowl and adjustable work rest. A valve controls the flow of water and there is a regulating nozzle and suitable piping. Bottom of guard trough is fitted for gravity return of water to the tank. A motor driven pump with tank is secured to the back of pedestal and suitable piping is provided for carrying the water to each guard. The pump has a capacity of 10 gal. per min. Both grinder motor and pump motor are operated simul-



taneously through a push button safety starter. This machine is also available as a combination wet and dry grinder.

Grinder and Buffer Series

WIDE type Marschke grinders by *Vonnegut Moulder Corp.*, 1843 Madison Avenue, Indianapolis, are designed to provide abundant clearance space around the wheel for grinding irregular and awkward

piece, as well as ample foot space for the operator. Machine comes in four sizes with motors from 1 to 7½ hp. at 1800 r.p.m. For buffing it is available without wheel guards



in sizes from 1 to 15 hp. and spindle speeds of 1800 or 3600 r.p.m. Overall spindle lengths range from 36 to 64 in. with spindle supported on four aligned ball bearings triple sealed with internal grease reservoirs. Motors are totally enclosed types operated through magnetic contactor push button control.

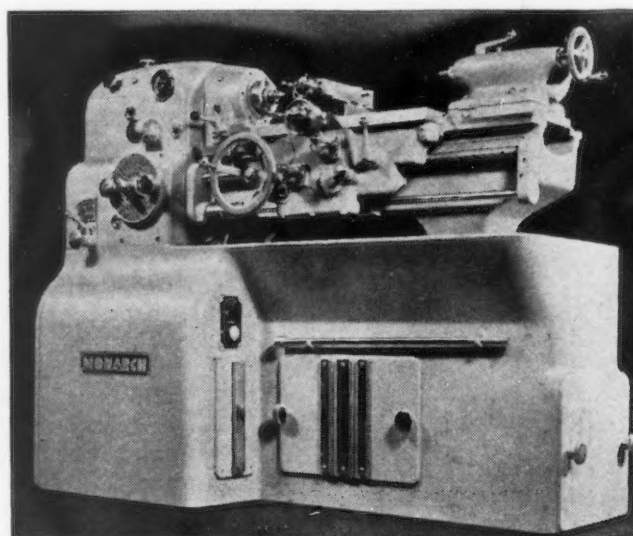
Sensitive Precision Lathe

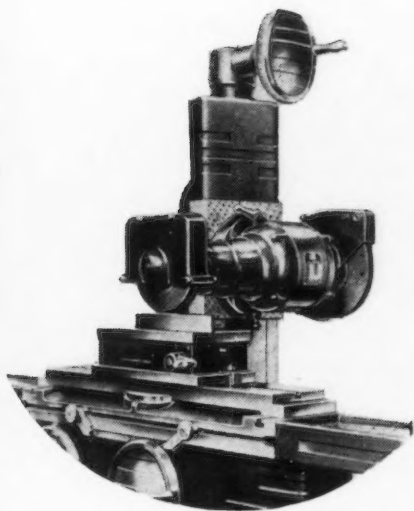
WITHIN the base of Model EE-10 lathe of *Monarch Machine Tool Co.*, Sidney, Ohio, a variable voltage drive unit is mounted. The drive consists of an a.c. motor, d.c. generator and exciter in the control unit, and a d.c. motor spindle drive. Control consists of a speed resetting rheostat and a relay control panel and is connected to the a.c. supply through a magnetic starter. For high torque at slow speeds a back gear unit is furnished and mounted on the

d.c. motor. Spindle speeds range from 4 to 4000 r.p.m. and it can be brought to a stop from maximum speed in two seconds through a dynamic brake. Overload and low voltage protection is provided in the starter. The spindle drive is started or stopped in forward or reverse by a control lever in front of the headstock through a drum switch. Relay control panel on a hinged bracket inside the cabinet base carries the forward and reverse contactors, field accelerating relay, condensers, discharge resistors, fuse block and relays for two stages of dynamic braking. Threads from 3 to 92 can be produced, swing over bed is 12½ and over carriage 6¾ in. Distance between centers is 20 in. and feeds range from 0.001 to 0.061 in.

Universal Grinder

COMBINATION universal grinder of all types of tool, cutter and reamer grinding, internal and external as well as surface grinding, has just been introduced by the *Machinery Mfg. Co.*, 1915 East 51st Street, Vernon, Los Angeles. This machine is equipped with a motor which swivels through 350 deg. and travels 8 in. vertically, and the column on which the motor is mounted turns through 350 deg. horizontally, travels 6 in. transversely and 16 in. longitudinally. The center of the motor and column are positioned to align either cylindrical or surface grinding wheels with the center of the bed. As surface grinder the machine accommodates a 6 x 10 in. magnetic chuck and will grind a complete area of 6 x 16 x 7½ in. above the table. The table is traversed by a two speed hand wheel and may be operated from either the front or the rear of the machine. Tools can be ground





gear. Gear box is a separate unit, fully enclosed, bolted and dowelled to the bed casting. Machine and ample auxiliary equipment is supplied by *Simmons Machine Tool Corp.*, Albany, N. Y.

High Speed End Miller

RUGGED and compact vertical type end miller has been brought out by *Univertical Machine Co.*, 620 St. Antoine Street, Detroit. It is a bench type machine with great flexibility which can perform milling, drilling, boring and grind-

height 37 in. and maximum lift from table to spindle 10 in. The $\frac{1}{4}$ -hp. motor is of heavy duty design. The 24 x $4\frac{7}{8}$ in. table has a cross travel of 17 in. and backward-forward range of 7 in., graduations show table movements to 0.001 in. The $\frac{1}{2}$ -in. tool holder is designed for the use of cutting tools from $\frac{1}{8}$ to $\frac{5}{8}$ in. diameter.

Light Lathe

NEW 11 and 12 in. lathes with 1-in. collet capacity of the *Sheldon Machine Co., Inc.*, Chicago, are fitted with pre-loaded ball or precision roller bearing headstocks with a $1\frac{3}{8}$ -in. diameter spindle hole. These lathes come in bench and floor types with semi- and full-quick change gear boxes, with plain aprons with power cross feed and with a choice of motor drives:



either a needle bearing overhead motor drive or the four-speed lever operated underneath motor drive which is entirely enclosed in a cabinet leg. A complete line of attachments and accessories is offered for each of these lathes.

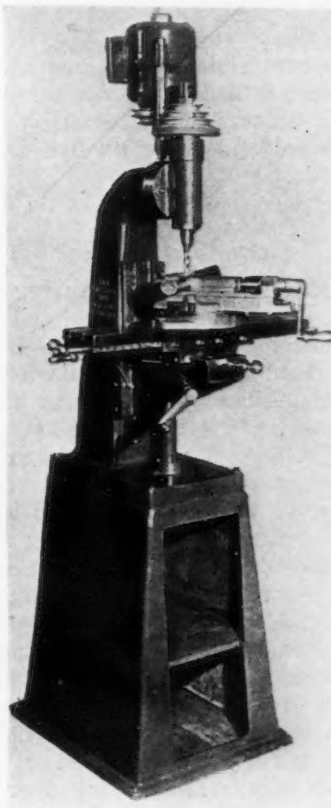
Milling and Threading Machine

PLANETARY milling is known for accuracy and high finish combined with volume production at low cost. In the new Plan-O-Mill of the *Gordon-R Co.*, 625 Washington Square Building, Royal Oak, Mich., the work is fixed and the milling head rotates. The machine is adaptable to a wide range of milling operations, but is especially suited for thread milling combined with a facing, chamfering or counterboring operation. The cutter can return to the center to perform spot-facing or chamfering operations concentric with the threaded

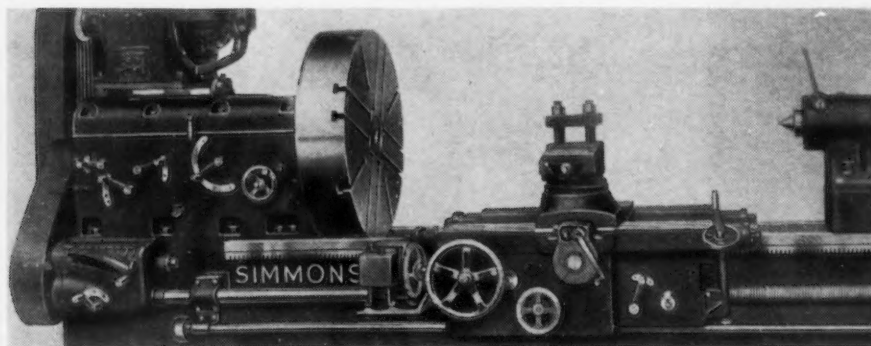
by tilting the motor and swiveling the column. A coolant pump may also be fitted. All standard attachments are furnished.

Heavy Duty Engine Lathe

THIS large lathe is constructed with a maximum of rigidity throughout to take heavy cuts on heavy parts in continuous duty operation. The bed is 42 in. wide and its construction makes it a firm foundation for headstock, tailstock and carriage. The head is fully enclosed and all bearings and gears are lubricated from an oil pump, provided with a filter and conveniently located. Speed changes of spindle range from 1.9 to 112 r.p.m. and come through sliding spur tooth gears and a heavy jaw clutch. The carriage bridge is 20 in. wide and compensates for heavy tool thrust loads. Power and hand feed for lateral, cross and angular movements are provided, as well as power rapid traverse for one or more carriages. Feed levers and lead screw nut are interlocked for safety. The leadscrew measures $2\frac{15}{16}$ in. The massive and compact tailstock is clamped to the bed with four heavy bolts. Spindle travels through a large diameter screw by a handwheel-controlled



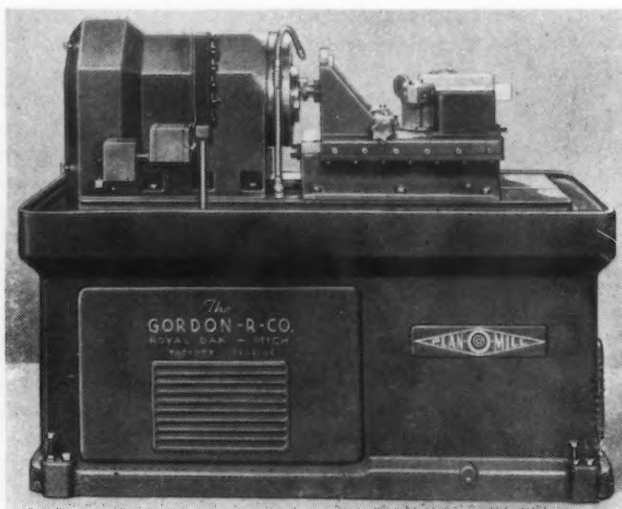
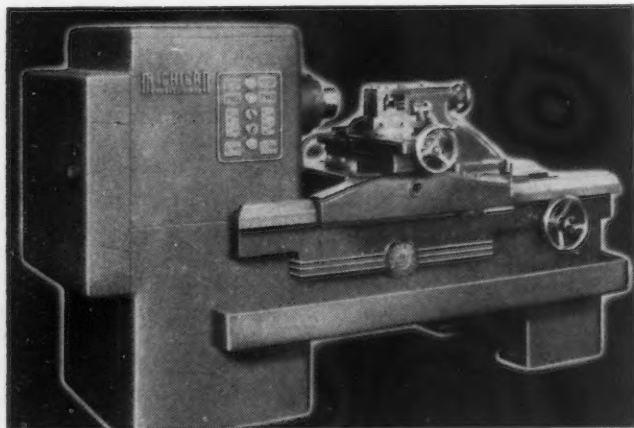
ing operations because of its swivel head and four speed range from 850 to 3400 r.p.m. The head is graduated over 90 deg. right and left of the vertical. Work clearance from the center of the spindle to the supporting column is $6\frac{1}{2}$ in., overall



hole. When the cycle is completed the machine comes to a complete stop and the oil flow is shut off. Fixtures may be hand, air or hydraulically operated and push-button controls are provided for stop and start. The eccentricity of the spindle is adjustable to micrometer dimensions. The number of revolutions is controlled through an adjustable worm-drive limit switch which makes operation repeatable. Working surface measures 26 x 20 in.

Cutter-Relieving Machine

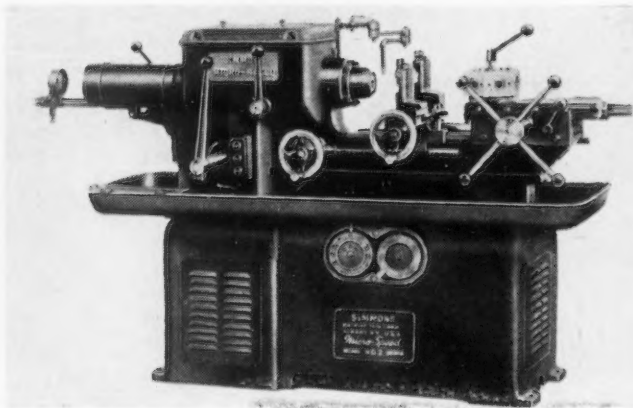
SIMPLICITY and speed of manufacture of rotary cutting tools of various types have been improved by a new universal cutter relieving machine, suitable for relieving form, gear and rack cutting tools, end milling cutters, spot facers, etc., with radial or side relief or both. This machine has been developed by *Michigan Tool Co.*, Detroit, with a multiple range of forward and reverse speeds obtainable through electrical control to handle virtually all forms of work at maximum efficiency. It also has a turntable for cam slide, permitting relieving from any angle, universal adjustable tool box, quickly interchangeable cams and lubrication from reservoirs with inspection portholes. The machine will handle work up to 8 in. diameter with a maximum length of 24 in. and from 1 to 24 teeth. Maximum relieving stroke is $\frac{3}{4}$ in. Five relief cams are furnished with the machine and



two reversible motors are coupled in such a fashion that either one or both motors make available four forward and three reverse spindle speeds.

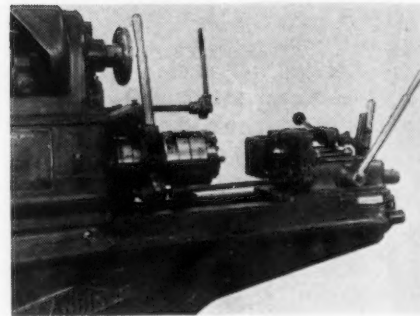
Turret Screw Machine

READILY adaptable turret lathe for rapid production and high precision bar and chucking work is produced by *Simmons Machine Tool Corp.*, Albany, N. Y., and designated as No. 2. The spindle, mounted on Timken precision tapered roller bearings, has speeds from 44 to 1500 r.p.m. All levers and controls are within easy reach of the operator. The Micro-Speed drive, combining an a.c. motor and a variable speed transmission, permits an unlimited range of speed changes while the machine is in operation. The brake locks the spindle instantly at idle for changing work. Motor driven coolant pump is provided, swing over bed is 14, and over cross-slide 6 in. The motor rates 3 hp. Other standard equipment includes magnetic reversing control, push button, automatic collet chuck and wire feed for bar work, etc.



Shell Cap Threader

A NEW fixture recently developed by the *Landis Machine Co.*, Waynesboro, Pa., provides a means for holding 37 mm. shell caps rigidly in alignment for threading. This special device comprises a hardened and ground supporting bushing, center and center locking member. In operation, the shell cap is placed on the supporting center while in the position shown in the accompanying illustration. The center is then moved forward until the work enters and seats in the bush-

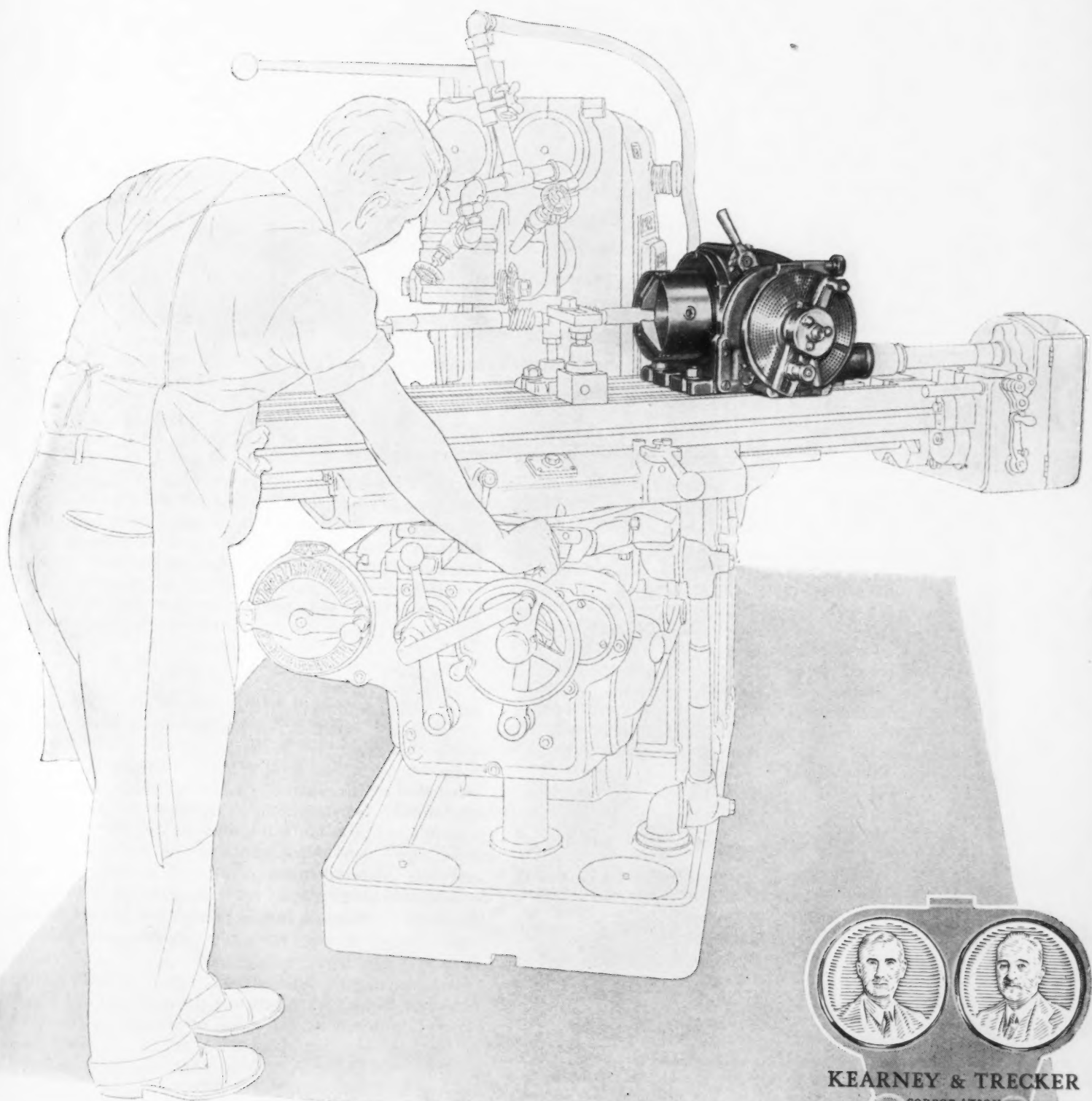


ing. A supporting center locking lever then locks the shell cap into position for threading. The entire unit is adjustable to assure perfect and permanent alignment. This fixture is designed for use on Landis $\frac{3}{4}$ and $\frac{7}{8}$ in. single or double head threading machines.

Editor's Note: All machine tools are under strict priority control today and orders are being filled in descending order of priority rating. About 180 plants on a critical list of prime defense contractors, however, take precedence over all other buyers in the order of their listing. Expansion of output of machine tool builders continues to rise and new producers are entering the field from month to month. Some new faces may be seen in the preceding pages.

The Model K Spiral Universal Dividing Head — a super-precision dividing instrument is built to provide a long lifetime of production service.

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DETROIT — We take the view that necessity isn't always the mother of invention. Sometimes inventions come into the world during periods when there is no apparent necessity for them. Yet they come, and wait around for an appropriate time to be adopted by someone.

One of these, nurtured for more than two years by Timken-Detroit Axle Co., is making its bow now under the name Axaloy. It is a nickel-free steel alloy said to have all the toughness, hardness and strength of previously accepted steels in the axle industry. According to W. F. Rockwell, president of the axle firm, it is one of the important substitute materials that offers assurance that trucks, buses and automobiles of 1942 will not have less strength or quality because of shortages of certain heretofore necessary materials.

Rockwell points out that in many instances thoroughly tested and proved materials have been withheld from production only because of the abundant supply of conventional materials with which manufacturers were more familiar. Now these will be brought out of laboratories and given a chance to prove their worth, perhaps one to five years earlier than otherwise might have been the case.

The new Timken material, although free of nickel, is alloyed with ladle additions of some unspecified materials and is given special heat treat to produce physical characteristics superior to those of steels now used. There is an Axaloy 140 for shafts, and Axaloy 325 and 420 for final drive gear teeth, which must have an exceptionally hard surface.

Amola Steel Another Example

Whatever the alloy actually is, it appears to fit into the growing family of nickel-free and low-alloy steels that have been pioneered by the automobile industry. Buick and Cadillac have gone a long way in this direction, we suppose farther than most others, and Chrysler's Amola steel is a sensational example, this latter material being a product of the research genius of the late C. Harold Wills who developed the Amola series to get away from high-priced chrome-vanadiums.

Metallurgists point to a wide variety of acceptable materials, saying that most of the problem is simply learning how to use them. A few years ago we were privileged to learn from Buick's R. B. Schenck the extent of Buick exploring in this field. An S.A.E. 4620 nickel molybdenum steel had been used for rear axle gears for years until the Buick metallurgists

On The Assembly Line

BY W. F. SHERMAN

Detroit Editor

• Axaloy, new nickel-free steel, joins automobile steel family . . . Canada still producing 300,000 units yearly, despite war . . . 1942 cars in United States will have plenty of "shine" . . . Michigan appoints Washington defense liaison man.

introduced a heat-treated 4120 chrome molybdenum which was less costly and more satisfactory, having a record for less rejection on account of gear noise. Before the new material went officially into production for ring gears and pinions, 5000 sets of gears of the new material were run through the shop on a production basis, giving a final determination of all the costs of machining and also giving production men a chance to determine practically the necessary steps in heat treating.

Because the parade of new materials never can stop (activated by cost and quality considerations most of the time, but by need for substitutions right now) Buick even then was engaged in experiment with three other steels, even lower in price, for differential

gears. Four different alloys were undergoing tests at that time to see if one of them could replace the chrome molybdenum steel used for 20 years on transmission gears.

Among proffered substitutes, many may display satisfactory final performance, but practical heat-treating cycles and speedy, low-cost machining are factors that must also be in the picture before one of these materials is OK'd for production.

The orderly purchasing of materials, normally a goal of every purchaser and vendor, is going by the boards, partly because buyers literally don't know what they want, or will want, a few months hence. One rolling mill's man tried last week to talk about late fall and early winter schedules with an automotive buyer. He learned that curtailment jitters, a too-common affliction around here now, made it impossible to get any schedule, even a tentative one. If the pow-wows in Washington can be brought to an end, and if authority is finally centered in one man (the industry hopes a reasonable one), maybe some auto schedules can be made up. After all, mass production hinges pretty much on the idea of having a schedule and sticking to it.

An automotive production expert recently transferred to an aviation plant made this point clear about scheduling when he defined a power-driven conveyor as "the mainspring, the timing device, of mass production—the thing that keeps your schedules on time for you."

Take Away the Files

Incidentally, if there has been any ignorance of mass-production technique in aviation plants (some doubt that there has been) it is being dissipated



NO NEWS TO P&W CUSTOMERS

The only "new" thing about salvaging worn gages by hard chromium plating is its special significance in speeding the defense program. Recent headlines have made it appear new. We started doing it over ten years ago . . . pioneered it in fact . . . and have been at it ever since. As you might expect, we are well equipped and well experienced.

Today when a gage becomes dangerously worn you don't throw it away. You send it to us for hard plating. We build up the necessary amount of chromium directly on the steel, and then refinish to size. We have saved our customers many hours and dollars by salvaging worn gages, as well as many other tools and machine parts. That means something now when every minute counts.

Never confuse "flash chromium plating" with hard plate. The first is done for appearance or surface protection, and is extremely thin. Usually it is put on over a thin plating of copper and nickel and simply polished. Hard plate goes right on steel and is built up heavily as required. It is finished to size afterwards.

Perhaps our facilities can help you maintain the pace by putting worn gages or parts back into the running. We will be glad to cooperate.

These gages all were worn out and then quickly restored "better than new" by hard chromium plating and refinishing to size.



PRATT & WHITNEY



Division Niles-Bement-Pond Company • West Hartford, Connecticut, U. S. A.



Photo by International

BUICK SHOVELMEN: Executives of the Buick company are shown "lending a hand" on construction of the new \$41 million airplane engine plant at Melrose Park, Ill. Left to right are J. G. Hammond, general manufacturing manager of Buick's Chicago division; O. W. Young, general manufacturing manager; Harlow Curtice, president, and C. A. Chayne, chief engineer.

rapidly. From the Ryan Aeronautical Co. plant comes a story from the lips of the assistant factory manager, telling how to get precision work and interchangeability of parts. The recipe is this: "Take away the files from all production mechanics in the final assembly department; if parts don't fit perfectly without filing, chase the trouble down in a hurry." That system works, unless the assembler has a hammer. Then watch out!

Appointment of an official State liaison man in Washington to expedite matters pertaining to defense work has been announced by Michigan's Gov. Van Wagoner. It seems like tacit acknowledgment of the growing centralization of power in the capital and of a growing impotence of state governments. Never before has this state, or any other that we know, had an official "contact man" in Washington, not even when all the unemployed were being fed and clothed and housed out of Washington largess. The naming of such a representative is indicative of an intertwining of governmental functions to a new and greater extent. Named to the post is Varnum B. Steinbaugh who

—significantly, perhaps—has been director of the Michigan Unemployment Compensation Commission. The governor instructed the new man to see William S. Knudsen and James Adams, the latter head of the new OPM automobile industry advisory board. It is understood that Knudsen and Adams approved the idea of naming such a contact man.

Knudsen's Plan Prevails

The "agreement" of Leon Henderson with Knudsen on the subject of automobile curtailment represents a considerable weakening of Henderson's earlier position. It also represents virtual agreement with the stand taken all along by the automobile industry and advocated by labor and sales groups. Essentially, it means an attempt to continue production as long as materials and labor can be obtained without harming the defense program. Sharp cuts will come, but later.

Canada is still producing about 300,000 automobiles per year, after two years of war, although a restriction has been announced with respect to 1942 models. Output in

the next model year will be less than half (about 44 per cent) of the 1940 figure, and it is announced that further curtailment may be imposed if conditions later warrant it. The number of models of passenger cars will be decreased by manufacturers from 147 this year ('41 models) to 79 in 1942. (For production figures of Canadian auto plants, see Page 76, July 31 issue.)

It now seemingly is agreed that U. S. production will be down about 20 per cent under last fall's level, for two or three months. From Oct. 30, onward, there is no idea about output, but it is assumed that it will be further decreased.

Many Interruptions Expected

The production curve probably will not be a smooth one, even in the first three months, however. If Nash's experience so far is any indicator, there will be a steady stream of interruptions, some minor, some major. Scheduled to open its Seaman division body plant on July 28, for full production of 1942 bodies, Nash couldn't get steel in time and had to postpone start of 1942 production for a week.

[CONTINUED ON PAGE 102]



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WASHINGTON — Complaint has been made that the President's message on price fixing legislation does not provide for a ceiling over wages or of prices of farm products. For this reason predictions are being made that the legislation will fail of its purpose as stated by the President—prevention of inflationary price advances.

The contention can be strongly supported. It can be pointed out that uncontrolled wages, the chief item of production costs, and unrestrained food prices, the principal item in the cost of living, throws the doors wide open to rising prices and therefore to inflation.

But it can be said for the President's message that it was a well done job that took into account these self-same arguments. It went farther in this direction than had been generally expected. The criticism might well be made that it should have been more specific, yet it is the custom for a Presidential message to set up the principal legislation and to leave the building of its mechanism to Congress, though Mr. Roosevelt has quite often seen to it that the machinery was of his own design.

In any event the test of the efficacy of the legislation, as is commonly the case, probably will depend on the administration. Administered fairly and sincerely, it should be an effective force against inflation.

This is seen from the implications that can be drawn from the President's message. It is a question whether its inferences will be transplanted into action. There are many who doubt that they will be. But certainly the message appears to serve notice on labor that it must not take advantage of the defense program to go on a rampage demanding higher wages where they have already risen to fair levels. Said the President:

"Of course there cannot be price stability if labor costs rise abnormally. . . . There will always be need for wage adjustments from time to time to rectify inequitable situations. But labor as a whole will fare best from a labor policy which recognizes that wages in the defense industries should not substantially exceed the prevailing wage rates in comparable non-defense industries where fair labor policies have been maintained."

Wage Control by Negotiation

The reason for use of the adverb "substantially" is not clear, since there can be no economic justification for a defense worker to receive higher wages than a non-defense worker, yet if this policy is faithfully carried out there will be wage control. It will be



• President's message on price-fixing legislation a well done job, going farther than expected . . . Farm block, seeking increases, is threat to forces combating inflation . . . Curb on wages presents another difficult problem.

wage control by negotiation and Mr. Roosevelt leaves the job of mediation to the National Mediation Board. Not in detail but in principle this was the policy pursued during the World War. There was no legislative control of wages.

The Taft-Walsh Board, technically known as the National War Labor Board, did not attempt to set a flat rate for any one craft or trade in the country as a whole. As pointed out in "American Industry in the War," by Bernard M. Baruch, Chairman of the War Industries Board, the World War Labor Board fixed standards to be determined for all industries in a given section of the country after "disclosing the conditions of life, including the cost of living and the service rendered."

In essence this was an administrative organization devoted chiefly to mediating disputes.

To bring the labor policies of the several war organizations into closer harmony, the War Labor Policies Board was created. Felix Frankfurter, now a Supreme Court justice, then assistant labor administrator, was made chairman of the WLPB. Franklin D. Roosevelt, now President of the United States, then assistant Secretary of the Navy, was the Navy representative on the Board.

Firmer Hand For Labor

The World War labor problems were well handled on the whole and if the conception is to solve them during the present emergency as was done in the earlier period, it is an encouraging sign. But if it is done, organized labor definitely will have to be ruled with a much firmer hand than at present when it is allowed, with an exception here and there, to tie up defense work without hardly as much as a mild protest to say nothing of stern action coming from the Administration.

Regarding farm prices, the President's message says nothing, though it does not specifically exempt agriculture from price fixing. It is safe to predict that no legislative effort will be made to fix prices of farm products. It may be that Leon Henderson's OPACS will cautiously venture a little farther than it has gone so far to fix prices of manufactured lines made from raw agricultural products but that probably will be all that can be expected. On the other hand, reports have it that "voluntary" control of agriculture will have a pattern in the legislated "parity price" level. Iniquitous as it is, it does provide a foil against rises that could be wholly destructive of any move to prevent inflation. So if used it will be a

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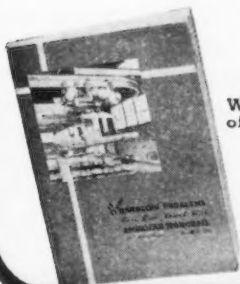
EVERY day more plants are adding capacity by putting their floor space to better use—by putting carrying jobs **overhead** with American MonoRail.

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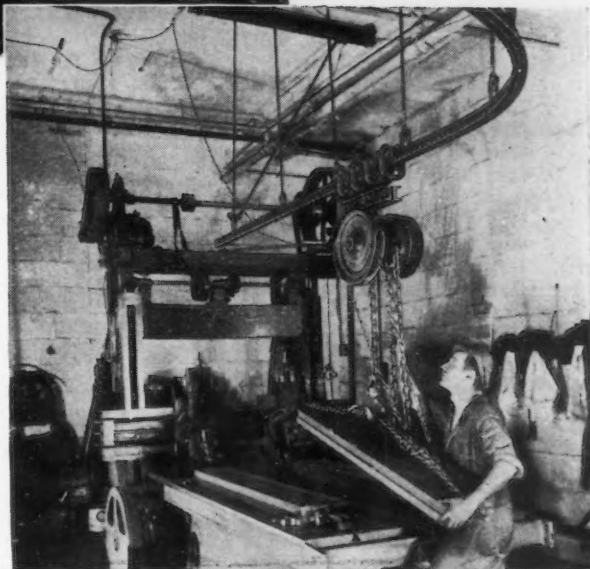
The men, too, relieved from lifting and carrying, give full time and skill to production and accomplish more.

Since standard parts are assembled into complete systems to meet the special requirements of the particular job, the cost of American MonoRail is surprisingly moderate. Operation and maintenance are a minimum. Supplied for manual, electric or automatic operation.

Let us arrange for an American MonoRail engineer to survey your requirements at no obligation.

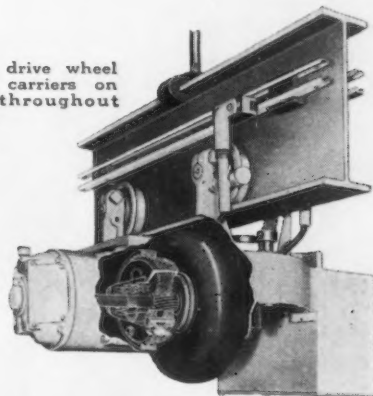


Write for copy of "Blue Book" showing hundreds of installations.



Easy placing of heavy die blocks in planer with no damage to dies or machinery.

Rubber drive wheel propels carriers on cranes throughout system.



THE AMERICAN MONORAIL CO.

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CLEVELAND, OHIO



Photo by Harris & Ewing

NAVY "E" FOR 14 PLANTS: Secretary Knox has awarded Naval Ordnance flags to 14 defense plants which have set high production marks. Industrialists, with Navy officials, receiving the flags are (left to right), Dr. John E. Livingood, vice-president, Textile Machine Works, Reading, Pa.; Leo L. Pollak, president, Pollak Mfg. Co., Arlington, N. J.; John B. Hawley, Jr., president, Northern Pump Co., Minneapolis; A. Bentley, president, Miehle Printing Press & Mfg. Co., Chicago; H. L. Frevert, president, Midvale Co., Nicetown, Pa.; Robert C. Stanley, president, International Nickel Co., New York; Carl M. Bernegau, vice-president, Keuffel & Esser Co., Hoboken, N. J.; K. T. Norris, president, Norris Stamping & Mfg. Co., Los Angeles; Edward F. Fisher, vice-president, Fisher Body Division, General Motors Corp., Detroit; Thomas B. Doe, general mgr., Ford Instrument Co., Long Island City, N. Y.; Secretary of Navy Frank Knox; Walter S. Carpenter, Jr., president, E. I. duPont de Nemours Co., Inc., Wilmington, Del.; Admiral Blandy, Chief of the Bureau of Ordnance, Navy; Edmond L. Lorehn, vice-president, Cameron Iron Works, Inc., Houston, Tex.; M. H. Eisenhart, president, Bausch & Lomb Optical Co., Rochester, N. Y.; Joseph Mahood, president, Arma Corp., Brooklyn, N. Y.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



medium for indirect control that will be better than a "free market" situation.

Greedy Farm Bloc Waiting

But here even, the always alert, greedy farm bloc in Congress wants to tear off the lid. It wants no control of prices for farm products, is eager for control of prices of industrial products.

Whether by psychic power, or whether tipped off by underground wire, the farm bloc apparently anticipated that the President's price fixing message would be broad enough actually to provide for control of farm prices, though it definitely made no direct proposal in that direction. But the crystal gazing bloc didn't miss it. There was in the President's message a paragraph which suggested a plan that could be used to control prices of any kind, agricultural or industrial. The government simply could go into the market and buy and sell and it happens that it has on hand enormous cotton and wheat loan stocks.

Here's what the President said:

"To make ceiling prices effective, it will be necessary, among other things, for the government to increase the available supply of a commodity by purchases in this country or abroad. In other cases it will be essential to stabilize the market by buying and selling as the exigencies of price may require."

The farm bloc must have sensed that some such thing was coming. So in the Senate it slyly and quietly prepared an amendment that was slicked through that branch of Congress and quite possibly will get through the House. It can hamstring price control of these major agricultural products, striking directly as it does at the government-buying-and-selling suggestion. This amendment simply and rigidly requires the government to hold during the period of the emergency all of its cotton and wheat loans!

A clever political trick that ought to be knocked into a cocked hat.

Limited Blanket Rating Goes To 40 Mine Machinery Makers

••• To facilitate the production of mining machinery and equipment, which is of crucial importance to the defense program, E. R. Stettinius, Jr., Director of Priorities, has issued a limited blanket rating to about 40 manufacturers of this equipment. The rating provided in the order is A-3 and is applicable to all deliveries of materials, which appear on the Priorities Critical List, unless a higher preference rating has been given to some particular item, in which case the higher rating may be applied. Provision is made for the extension of the A-3 rating to the sub-contractors of manufacturers granted use of the order.

The order is designed to relieve an acute shortage of machinery for underground and open-cut mining operations and for the preparation of coal and metallic ores for shipment. It is applicable to equipment and material entering directly or indirectly at any stage, into the construction of mining machinery by the producers granted the A-3 rating. Its extension to sub-contractors does not cover machinery or equipment used by these sub-contractors in their own manufacturing processes.

SIGNALS



"Everything under control"

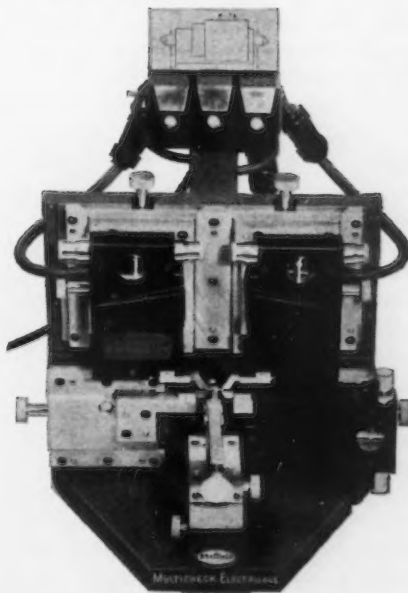
The Multichek Electrigrage is like a battalion of U. S. troops. They quickly establish order and have everything under control. The Multichek Electrigrages check a number of dimensions on a work part simultaneously, flashing the answers on a control panel.

This panel carries an elevation drawing of the work piece with each critical dimension shown. A signal light is provided for each of these dimensions.

A signal light showing red indicates its dimension is undersize, green an oversize dimension and amber that the dimension is truly within tolerance limits. When four or more measurements are being checked a master signal may be provided at the top of the panel to show white when all dimensions are correct. Thus the inspector looks only at the master signal unless it indicates trouble somewhere below.

Other models of this instrument are just as effective on extremely large shell bodies as this model is on small pinions less than a quarter of an inch long. Every part produced in large quantities which has several dimensions to be checked should be inspected on the Multichek Electrigrage regardless of bulk.

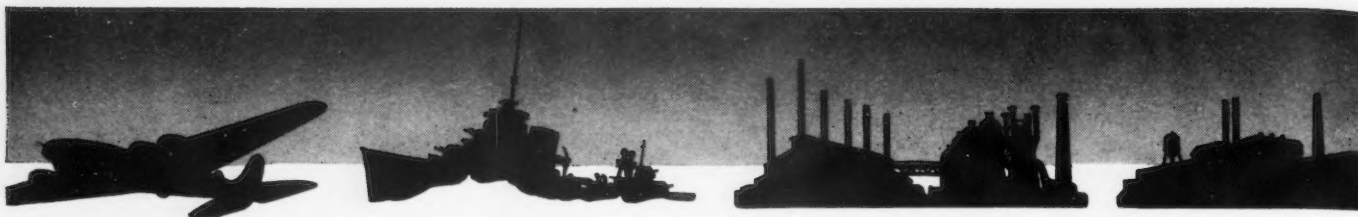
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THE SHEFFIELD
CORPORATION
Gage Division • DAYTON, OHIO, U.S.A.



ON THE WEST COAST



SAN FRANCISCO — Any attempt to translate dollar volume sales of individual aircraft companies into plane units delivered must be extremely inaccurate. With most contracts containing escalator clauses of various sorts, and with costs rising, each new government dollar spent for planes is buying fewer aircraft. For this reason, financial reports showing large dollar sales increases do not mean a corresponding increase in number of planes delivered. As our grammar school teacher warned us, you can't add peaches and plums and get pears.

Nevertheless, financial reports and general announcements provide the only clues as to which aircraft companies were responsible for the industry receiving less praise from William Knudsen during his recent visit than other facets of the Pacific Coast defense effort.

Sales by North American Aviation Inc. during the six months ended June 30 amounted to \$36,020,650.39 as compared with \$14,578,317.10 for the first six months of 1940. The 1941 figure is approximately two and a half times the 1940 total which, in most industries, would be considered a more than respectable expansion. Sales for the first quarter of 1941 were \$16,745,987.25 as compared with sales of \$19,274,663.14 for the second quarter of this year. This rate of climb is not rapid, and the strike period and an apparent slowdown in the period immediately preceding the strike is evidenced. Conducting a post-mortem, one of the chief employee excuses for the strike was that the company was not passing on in wages "Sky-high" profits. Unaudited results of operations for the six months ended June 30, 1941, showed a consolidated net profit for North American of \$3,900,744.95 after provisions for estimated Federal income and excess profit taxes in the amount of \$7,094,000.

Douglas Aircraft Co., with a

• Earnings reports of California, Washington aircraft companies reflect gain in output . . . Fewer OPM orchids go to plane plants in defense effort . . . Japanese ship withdrawal affects defense shipments to the Canal.

much larger plant to begin with, would not be expected to make as large an advance in deliveries in proportion to last year as some of the smaller plants. Thus, the company's announcement that for the first six months of this year it delivered 99.23 per cent more planes than in the corresponding period a year ago is not as disappointing as would appear at first glance, though it is certainly no cause for elation. Although the company's statement provided no data on the number or volume of deliveries, a comparison of backlog position and new orders indicates that deliveries for the seven months of its fiscal year to June 30 were in the neighborhood of \$61,000,000 or more than for the entire fiscal year ended November 30, 1940, when sales totaled \$60,970,000. Douglas offset this advance, lest it not be considered rapid enough, by an announcement that deliveries of military airplanes by the company during June ran 30 per cent ahead of May. This upturn compares with a national increase of approximately 10 per cent.

Vultee Aircraft Inc., whose mechanized assembly line in its California plant has been viewed with great favor by those who believe the aircraft industry should employ techniques of the automobile industry, reports billings for

the six months ended May 31 of \$8,332,976. This is an increase of a little over eleven times billings during the corresponding period of 1940, \$738,520. That production does not always mean profit is clearly shown in Vultee's net loss for the 1941 period of \$593,488 compared with a net loss of \$335,318 for the same period of the preceding fiscal year. Although Vultee dedicated a new plant at Nashville, Tenn., in April, President Richard W. Millar reports that "comparatively few deliveries were made from the new Nashville plant during the first half of the current fiscal year." This statement is not as disappointing as it sounds, for only about six weeks elapsed between the completion of the plant and the end of the fiscal year, May 31, and President Millar hastens to predict "volume of output from Nashville during the last half of this year is expected to approximate five times that for the six months ended May 31."

Consolidated Most Spectacular

Production of Consolidated Aircraft Corp., San Diego, was the most spectacular of any of the companies for the first six months of 1941 as compared to the first six months of last year. Net sales for the first six months of 1940 were \$408,407; during the same period this year they totaled \$35,930,448 or nearly 88 times the previous figure. Further analysis shows that production for the first six months of 1941 was nearly four times the company's total output for the entire year of 1940, \$9,349,550. This production rise is dramatized in payroll figures. Eighteen months ago, the firm's payroll listed only 3,170 employees. Today, more than 19,000 are at work.

The OPM is not handing out orchids for production of non-military planes, but Boeing Aircraft Co. uses this type of ship to demonstrate its production speed-up. Last week Boeing delivered to

RESEARCH

a liability or an Asset?

● Engineering research and development are upsetting many of our most common practices. To some, these new developments are a liability because they make present products obsolete. To others, they are an asset because they mean a wider market—a better market. Take hydraulic drives for example: both the hydraulic clutch and the hydraulic torque converter—each is establishing a place for itself, purely on the basis of the improved performance which it provides.

The Twin Disc Clutch Company has already supplied many of these new hydraulic drives to manufacturers of logging and oil field machinery, builders of power shovels, locomotive cranes, diesel engines, locomotives and railcars. Almost daily, new uses are being uncovered . . . balanced units are being designed which take full advantage of the work characteristics of hydraulic drives.

Right now, while your new product must await the completion of the "big job" we all have on our hands, why not investigate Twin Disc Hydraulic Drives? Bulletin A-132 tells the whole story. Ask for it on your business letterhead.

TWIN DISC CLUTCH COMPANY • 1370 RACINE STREET • RACINE, WISC.



Pan American Airways the last "clipper ship" of their second order for six of these birds. Fulfillment of the Pan American contract is seven months ahead of contract deadline, February, 1942. Boeing is now concentrating on military orders, news which should please Mr. Knudsen.

By and large, the Pacific Coast aircraft industry is continuing to install rubber pad presses for its forming operations. North American Aviation Inc. announces that 3000-ton hydraulic presses, number unspecified, have been newly installed in its Inglewood, Cal., and Dallas, Texas, plants. These presses are capable of exerting pressures ranging from 1/64 lb. per square inch to 1250 lb. per square inch. The point of contact between the pressing surface and the material is cushioned by seven one-inch rubber mats, cemented together to form a cushion. When under stress the cushion fills in all crevices of the part, thereby keeping the pressure uniform over the surface of the part being formed. It is significant that the Coast factories are sticking to this forming method, originated by Douglas, despite reports that contractors for aircraft components among automobile makers are utilizing the conventional male and female dies.

Hopes of rapid expansion of steel production on the Pacific Coast should be highly discounted except in cases where knocked down east-

ern mill equipment is shipped for erection here. One firm, which operates a small electric furnace plant and rolling mill has been waiting for weeks for delivery of a new steel melting furnace from Pittsburgh. The furnace has been promised from week to week, but actual rolling operation still appears a long way off.

Scrap Offerings Lighter

Scrap steel offerings are reported to be much lighter at Seattle. Scrap cast iron there is scarce. Foundries in recent years have been reluctant to carry surplus stock of cast scrap and the present boom finds them buying from day to day.

One Seattle scrap steel dealer attributes the evaporating flow to some extent to the great employment increases in that territory. He reasons that formerly semi-idle men would ferret out hinterland supplies during periods of unemployment. Now with regular jobs opening up, these former scrap gatherers have ceased operations. This particular scrap dealer reports that his intake of scrap decreased from 60 to 75 per cent over the average for the past one and a half years.

A straw in the wind indicating Seattle industrial activity is the report that the Northern Pacific Railway is now operating 35 switching locomotives there. The World War peak was 28 locomotives.

The chief repercussion from the Japanese situation insofar as the steel industry on the Pacific Coast is concerned will probably be in further withdrawal of ships from the inter-coastal trade to take the place of Japanese vessels which are now shunning the United States. Japanese ships last year handled nearly all defense shipments from the Pacific Coast to the Panama Canal. For instance, last year Los Angeles sent 307,000 barrels of cement to the Canal, more than any other port; during the first quarter of this year Los Angeles shipped 130,000 barrels as compared to New York's 115,000, leading all imports by a wide margin. Nearly all of this was carried in Japanese ships. If vessels are withdrawn from the inter-coastal run to carry defense materials to the Canal, replacing the now vanished Japanese vessels, the now severely throttled water-borne inter-coastal trade will very nearly strangle to death.

Labor shortage on the Pacific Coast before very many months is still in prospect. Only three and a half per cent of the nation's industrial workers are in California, yet 11 per cent of the defense contracts have been placed here.

Correction: Reference was made in this column in the July 10 issue to seven-ton castings for Boeing's Flying Fortresses. This reference should have applied to Seattle shipbuilding operations. Aircraft castings are not quite that large yet.

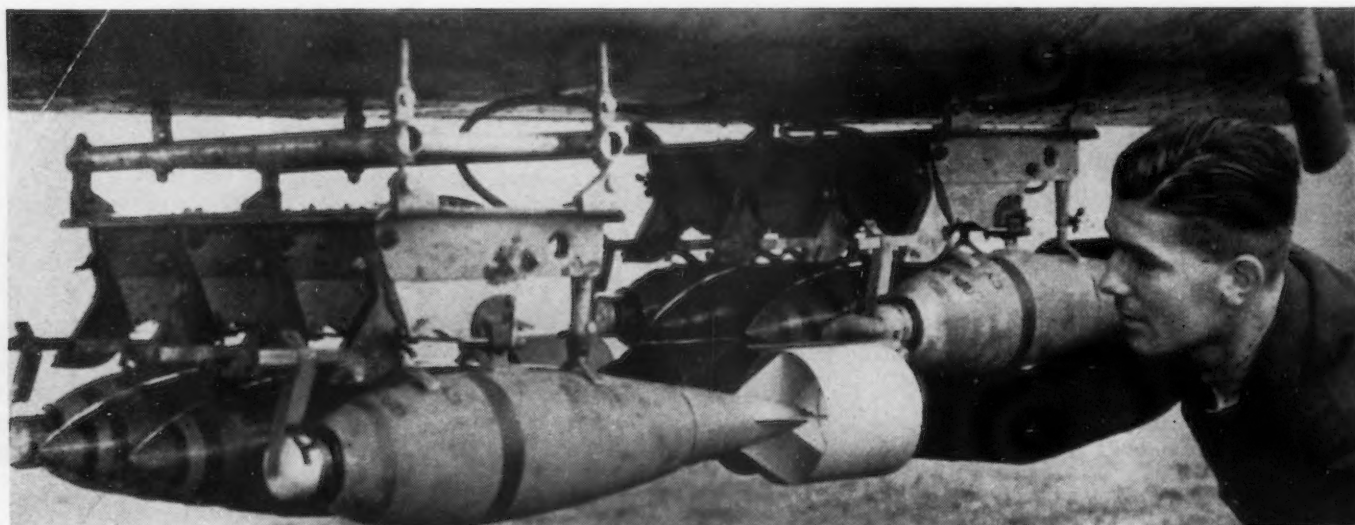
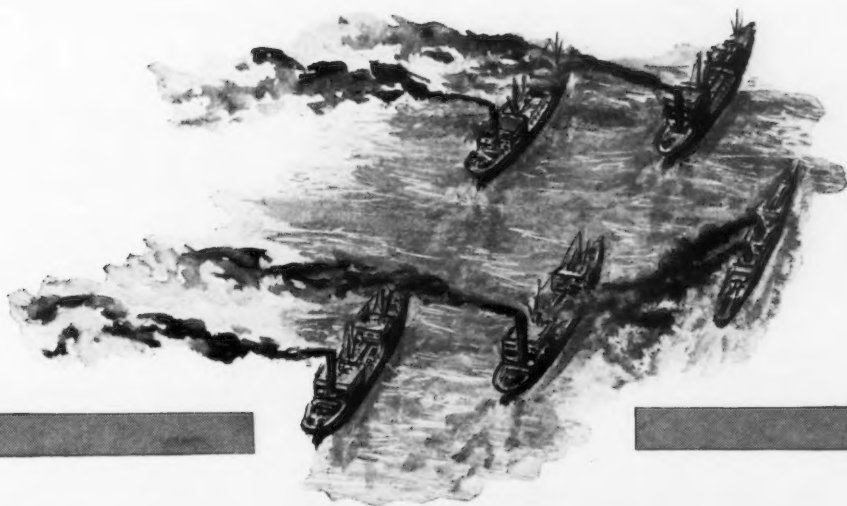


Photo by British-Combine

BOMB HOLDERS: Devices by which bombs are fastened, then dropped from planes have been highly developed in England. The Blenheim bomber (above), according to a description passed by the British censor, is being loaded with small bombs for use in attacking enemy escort vessels in waters off Denmark.



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BORGER, TEXAS	Hart Industrial Supply Co.	MILWAUKEE, WIS.	Machinery & Welder Corp.
BOSTON, MASS. (Belmont)	H. Boker & Co., Inc.; W. E. Fluke	MOLINE, ILL.	Machinery & Welder Corp.
CHICAGO, ILL.	Machinery & Welder Corp.	NEW YORK, N. Y.	H. Boker & Co., Inc.
CINCINNATI, OHIO	Williams & Co., Inc.	OKLAHOMA CITY, OKLA.	Hart Industrial Supply Co.
CLEVELAND, OHIO	Williams & Co., Inc.	PAMPA, TEXAS	Hart Industrial Supply Co.
COLUMBUS, OHIO	Williams & Co., Inc.	PITTSBURGH, PA.	Williams & Co., Inc.
DETROIT, MICHIGAN	C. E. Phillips & Co., Inc.	PORTLAND, OREGON	Industrial Specialties Co.
ERIE, PENNA.	Boyd Welding Co.	ROCHESTER, N. Y.	Welding Supply Co.
FT. WAYNE, IND.	Wayne Welding Supply Co., Inc.	SAN FRANCISCO, CALIF.	Ducommun Metals & Supply Co.
HONOLULU, HAWAII	Hawaiian Gas Products, Ltd.	SEATTLE, WASH.	H. A. Cheever Co.
HOUSTON, TEXAS	Champion Rivet Co. of Texas	ST. LOUIS, MO.	Machinery & Welder Corp.
KANSAS CITY, MO.	Welders Supply & Repair Co.	SYRACUSE, N. Y.	Welding Supply Co.
		TOLEDO, OHIO	Williams & Co., Inc.

Fatigue Cracks

—BY A.H.DIX—

One "R" to Come

So Mr. Henderson again served notice that the government must stiffen its control over prices—"no matter how onery and belligerent the outcries become.—From the Washington section of the July 24 IRON AGE.

Always eager to improve ourself, we looked up *onery* in our drugstore dictionary and also in the brains department's big word book. No luck. The nearest thing to it is *oner*, pronounced *wunner*, which the dictionary says is a slang term applied to an extraordinary individual or thing, although we don't recall ever hearing anyone or anything called a *oner*. If we did, we probably thought the speaker meant *wonder*, but grew up in Canarsie and high-hatted his d's.

Maybe Messrs. Moffett and Ellis, who are responsible for the superb reporting job being done on the Washington situation, will let us know whether *onery* is an expression peculiar to the Capital. Our guess is that the price administrator, who is a great hand at using super-charged adjectives, said *ornery*. *Ornery* and *belligerent* make a potent pair, but are not up to the high hit by the high-compression Henderson a few months ago when he referred to a certain price situation as being *cruel* and *butcherous*.

Year 'Round Closed Season on Salesmen

• • • Emerson Findley, the advertising department's lank, learned Central Western manager, says this sign hangs in the reception room of a northeastern Ohio plant:

During years as a salesman I learned somewhat of their problems and I desire sincerely to make your call here so enjoyable that it may be a pleasant recollection.

(Signed) President

Aptronyms

• • • A. J. (General Abrasive Co.) Sandorff says a sign at Lake Rosseau, Ontario, reads, "T. J. Bull & Son—Fresh Milk."

One of Binghamton's leading dentists is James T. Ivory.

Jesse (Lehman Brothers) Robison tells us that Lehman's expert on non-ferrous metals is Montague H. Zink.

Contango, Backwardation

• • • George R. Woods sends us a clipping of a tin market report in *The Ironmonger* (England), reading, "From a backwardation the position was reversed to a contango of £2."

"Can you," he asks, "tell us about contango without consulting Xavier Cugat?" We put it up to No. 3 chair in the brains department, who answered with a yawn, "*Contango is the differential between prices of spot tin and futures, when futures are selling above spot. Backwardation is the opposite.*"

Despite its Latin sound, contango is strictly Nordic, being merely a corruption of *contingent*.

Midwestern Scotch

Read your item about the importation of Sheffield water for heat treating. One time a well-known North American distillery bought a Scotch distillery and brought it across the ocean, complete even down to the mash tubs and paddles. Also came a shipment of Ayr water (all the Scottish distilleries are in the Ayr valley) and a shipload of Scottish peat to fire the barley. It was all used to make Western Hemisphere Scotch. The whiskey was terrible.

—Deac

Stoppers

• • • Uncle Sam was pushing them — I steered them straight—*Rotor Tool Co.*

Snowed under in June—*Torrington Mfg. Co.*

Dilly

• • • A word, new to us, that we are encountering in letters from our Western correspondents is *dilly*. As we understand it, this Coast contribution to the beauty of the language is synonymous with *darb* or *lulu* and is used to express supreme admiration. "It's a dilly" means that it is the best or close to the best in its class. Of course, by introducing the merest shade of irony, you can make it mean just the opposite.

We are not yet quite up on all of dilly's uses, but understand that unlike *darb* or *lulu* it is seldom applied to persons. Paulette Goddard, for instance, is a *lulu* but not a *dilly*, whereas the new tool steel directory is both a *lulu* and a *dilly*. It is a reprint of the series, "1500 Tool Steels," in 64-page, pocket-size booklet form. Twenty-five cents in stamps, sent to us at 100 E. 42nd St., N. Y., will get you a copy.

Camp Language Colorers

• • • We learn from *Army Ordnance* that among the Army's latest slang inventions are:

<i>Homing device</i>	<i>A pass or furlough</i>
<i>Gravel agitator</i>	<i>Infantryman</i>
<i>Popsickle</i>	<i>Motorcycle</i>
<i>Rat race</i>	<i>Mounted review</i>
<i>Crossbar hotel</i>	<i>Guardhouse</i>
<i>G. I. (Government issue)</i>	<i>War maneuvers</i>
<i>Sky winder</i>	<i>Air Corps man</i>
<i>Little poison</i>	<i>37-mm. gun</i>
<i>Flying the wet beam</i>	<i>Pilot flying along a river</i>
<i>Hit the silk</i>	<i>Use a parachute</i>
<i>Hell buggy</i>	<i>Tank</i>

"Little poison" and "hell buggy" sound like carryovers, but the others are all new to us, and one of them, *homing device* as slang for *pass*, is pure genius.

Bellringer

• • • To say that the editorials in your favorite family journal have attracted a greater audience than has anything else in the history of industrial journalism is merely to state the obvious.

We bring it up again simply because at this writing it looks as if the demand for the July 10 editorial will establish a new all-time high. That was the one entitled, "*When They Say 'No,'*" about how to turn down orders gracefully. Reprint orders are for quantities running as high as 17,000, and demands are still being made by mail and wire.

If you would like a couple of extra copies we'll be glad to send them to you free gratis, no charge.

Puzzles

• • • We don't know what the answer is to last week's one about the golf pros, as this is being written before the masterminds have had an opportunity to tackle it. But W. C. Marshall, who sent it in, believes the total number of combinations is somewhere in the neighborhood of 785.

"Jack Canuck" of Montreal offers to bet a flock of Canadian dollars against practically nothing that there are not more than four answers to the July 24 problem about arranging the nine digits so that the second three will double the first three, and the last three will triple the first three. He sends in four answers. A. W. Kelly, W. C. Marshall, W. C. Ekin and Geo. N. Benoit send in the same four, so it looks as if Ethel Barrymore's famous line applies. The four are 192,384,576; 219,438,657; 273,546,819, and 327,654,981. Wm. H. Evans got two of them and Wm. Barber one, and E. L. Kahn three.

Only one mastermind unscrambled the difficult July 17 problem about the disposition of troops. The m.m. is Ralph D. Silver of Chicago.

You might toy with this while the coffee is percolating:

Two hunters, wishing to determine the weight of a fox they had caught, balanced a plank on a fence, and then balanced each other on the plank. They then exchanged places, but this time the lighter man held the fox in his lap. They found the plank balanced again. If the hunters weighed 150 lb. and 180 lb. respectively what did the fox weigh?

BRIGHT HARDENING

SAVES TIME AND MONEY

Hydryzing speeds production by eliminating cleaning operations such as sandblasting or pickling.

If you harden springs, stampings, or other small parts here's a really simple way to improve your product and save plenty of money doing it.



SAMPLE PACKET OF HYDRIZED PARTS!
See what Hydried parts actually look like.
A letter will promptly bring you a packet of samples, and descriptive literature.

Have you often wondered how you could harden your springs, stampings, and other small parts without scale or discoloration? You can, and not only harden them without scale or discoloration, but harden them absolutely bright so that their original shiny surfaces are preserved intact.

Thus, you no longer need remove scale from hardened parts by means of pickling, sandblasting or other cleaning operations. Hydried parts look better because of their smooth, shiny surfaces, and take a smoother plating job because there are no pits due to scaling or subsequent cleaning operations. We'll be glad to Hydrie a batch of your parts to demonstrate the many savings possibilities of Hydrying.

LINDBERG ENGINEERING CO.

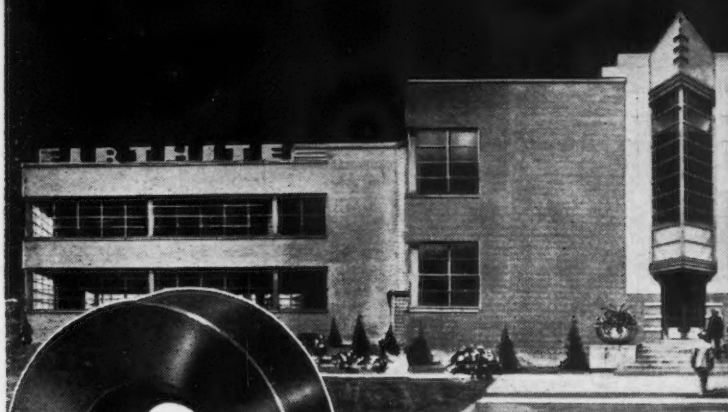
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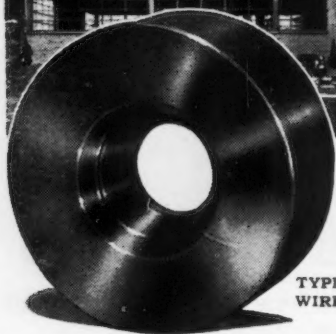
LINDBERG FURNACES

CYCLONE FOR TEMPERING • HYDRIZING FOR HARDENING

HARDINGE *Precision Lathes* at FIRTH-STERLING STEEL CO.



A THOROUGHLY MODERN AND FULLY
EQUIPPED FACTORY FOR MANUFACTURING
FIRTHITE CARBIDE TOOLS
AND FIRTHALOY DIES.



TYPICAL
WIRE-DRAWING DIE

AN INTERESTING COMMENT:

"In the manufacture of Firthaloy tungsten carbide dies, we have found the HARDINGE High Speed TR59 Precision Preloaded Ball Bearing Lathe to be indispensable for maintaining consistent accuracy."



THE MODERN HARDINGE
HIGH SPEED PRECISION LATHE

"The Units in our Firthaloy die shop are capable of working to the extremely rigid tolerances we must adhere to when making dies and, also, gages to check the dies."

"The combination of high speed and accuracy in these machines, together with the feature of rapid change through a variety of speeds, has made it possible for us to supply uniform dies in quicker time."

The above comment was forwarded to us by the Firth-Sterling Steel Company, McKeesport, Pennsylvania. HARDINGE Precision Lathes are also used by Firth-Sterling sub-stations throughout U. S. for reworking wire drawing dies. Hardinge Precision Lathes for Production, Tool-room and Laboratory Departments

HARDINGE BROTHERS, Inc., ELMIRA, N. Y.

"PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE"

News of Industry

Grace Calls New Plants Useless if Scrap is Lacking

• Edwin C. Barringer, executive secretary of the Institute of Scrap Iron and Steel, refutes allegations of steel company officials that heavy exports in the past are cause of the present scrap problem and explains how scrap trade has sought to increase supplies... See page 118.

•••The scrap steel shortage, most serious threat to continued capacity operation in the nation's steel mills on defense orders, moved rapidly to a climax this week, with several top steel company executives publicly voicing concern over the scrap problem.

E. G. Grace, president of Bethlehem Steel Co., warned that it is useless to build new steel capacity until the scrap problem is solved. Irving S. Olds, chairman of U. S. Steel Corp., described the situation as "very serious" and said that in some cases the shortage is already restricting steel production. C. R. Hook, president of American Rolling Mill Co., attributed the scrap shortage to the exportation of some 20,000,000 tons between 1934 and 1940.

Meanwhile, the scrap trade, OPACS and the OPM intensified efforts to speed up the flow of scrap. Auto wreckers in Ohio last week formed a committee to develop means of stimulating the scrapping of old automobiles. In Cleveland the Gray Iron Founders Society recommended community drives as a step toward relieving

the shortage. Two community drives already underway, sponsored by American Rolling Mill and Wheeling Steel Corp., were reported meeting with enthusiastic response.

The pig iron expansion announced last week, which will take from 12 to 24 months to complete, will only provide enough pig iron to replace dwindling scrap supplies, Mr. Grace said at a press conference following the quarterly meeting of the board of directors last week. The industry may not be able to maintain present rates of steel production, he asserted, if increased scrap supplies are not

forthcoming. The decrease in the nation's scrap reservoir has been to the heavy exports over the past five years, he said.

Three possible means of meeting the shortage are under discussion in official quarters, Grace revealed. These measures are limiting of British purchases in this country as much as possible to finished steel products; a nation-wide community drive similar to the recent scrap aluminum campaign; and tapping of hidden reserves of automobile, structural and heavy scrap in industrial centers.

The purpose in limiting British

The Backbone Of The Nation's Defense

S-T-E-E-L

Is Being Weakened By A
SHORTAGE OF SCRAP IRON & STEEL

UNLESS MORE SCRAP IRON AND STEEL IS OBTAINED IN THE NEXT TWO WEEKS
Curtailment Of Operations Will Be Necessary
At The American Rolling Mill Company's
Middletown Division

YOU CAN HELP

If You Own Scrap Iron or Steel, Or Know Where Some Is Located

Contact The **ARMCO DEFENSE COMMITTEE**
Telephone Middletown 3000--Extension 337

LOCAL SCRAP DEALERS
ISAAC SILVERMAN
BLUMBERG & COHEN Inc.
Are Cooperating With The Armco Defense Committee In This Endeavor

YOU CAN HELP: You can help avoid curtailment of steel production due to the shortage of iron and steel scrap, citizens of Middletown, Ohio, were told last week by American Rolling Mill Co. in a series of newspaper advertisements, reproduced above, appearing in the *Middletown Journal*. Highlighting the industry-wide scrap shortage, the Armco community drive, first of its kind in the present emergency, was met with an encouraging response, company officials report.

semi-finished steel purchases would be to keep the scrap resulting from the processing of this material in this country, the Bethlehem executive said.

Mr. Grace cited as an indication of the seriousness of the shortage the fact that the company's Lackawanna (Buffalo) plant, which normally builds up large scrap stocks during the Great Lakes open season to carry through the winter, has not been able to add a single ton in inventories thus far this year since navigation on the lakes was open.

While Grace did not say so, it is known that the heavy exports to Canada from Buffalo have been an important factor in the company's inability to build up reserves against the winter months.

In an effort to obtain enough scrap to keep its plant going, the Bethlehem president reported that scrap was being imported from Mexico and Cuba. The company purchases about 300,000 tons of scrap a year in the open market to maintain capacity operations.

Defense officials conferred during the week with the scrap trade and the members of the Iron and Steel Industry Advisory Defense Committee on means of correcting the deficiency of the scrap iron and steel. It was unofficially predicted that test campaigns to test the possibilities of community collection would get underway in Ohio early this month. Scrap collections must be stepped up at least 25 per cent, it was said, if present rate of ingot output is to be maintained.

Urge Public Scrap Drives

Cleveland

••• Public drives for iron and steel scrap collection were urged here when members of the Gray Iron Founders' Society, Inc., met Tuesday at Hotel Cleveland to discuss the scrap and raw materials situation.

W. W. Rose, executive vice-president of the society, said that industries needing scrap will have to foster community "house cleanings." However, scrap dealers should not be by-passed but given every opportunity to handle the scrap once it has been col-

26,533,000 Tons Scrap Used In Six Months

••• Domestic steel mills and foundries consumed 26,533,000 gross tons of iron and steel scrap in the first half of 1941, exceeding by 46 per cent the 18,212,000 tons melted in the first half of 1940, the previous record, according to an estimate by the Institute of Scrap Iron and Steel.

In the first half of 1939 consumption was only 13,214,000 gross tons or less than half that of the first half of 1941. At the peak of the first world war monthly consumption averaged only 2,200,000 tons, compared with 4,422,000 tons thus far in 1941.

Exports of scrap in the first five months of 1941 totaled 350,715 gross tons, compared with 1,152,341 tons in the corresponding period of 1940. Export scrap is moving only to Great Britain, Canada, and Mexico.

lected by Boy Scouts and neighborhood clubs and gangs, he urged.

Reclaiming of paved-over street car rails also will yield considerable scrap, said Mr. Rose. In Youngstown, Ohio, hydraulic jacks are pulling rails up out of 4-in. of

Coming Events

Aug. 25 to 29—National Association of Power Engineers, Baltimore, Md.

Sept. 17 to 19—National Industrial Advertisers Conference, Toronto.

Sept. 23 to 26—Association of Iron and Steel Engineers, annual exhibition and meeting, Cleveland.

Sept. 25 and 26—Society of Automotive Engineers, National Tractor Meeting, Milwaukee, Wis.

Sept. 29 to Oct. 2—American Mining Congress - Metal Show, San Francisco.

Oct. 1 to 4—Electrochemical Society, Fall Meeting, Chicago.

Oct. 6 to 10—National Safety Congress and Exposition, Chicago.

Oct. 14 to 16—American Railway Bridge and Building Ass'n, Chicago.

Oct. 16 to 18—American Society of Tool Engineers, semi-annual meeting, Toronto.

Oct. 20 to 24—National Metal Exposition, Philadelphia.

Oct. 20 to 24—The Wire Association, Philadelphia.

concrete and steel ties, he said. The cost is estimated to be around \$5.40 per gross ton.

Mr. Rose said he had advocated to Washington that scrap price ceilings be applied solely to sellers of scrap, with the buyers' responsibility only to make accurate monthly reports of all transactions. Official definition of grades is needed, he said.

The meeting was one of a series of meetings on scrap being conducted by the society throughout the country. Others have been held in Dayton and Cincinnati, Ohio; Chicago; Worcester, Mass., and New Haven, Conn. Mr. Rose is leaving for the West Coast on Aug. 7 to hold conferences in Seattle, Portland, San Francisco and Los Angeles, all of which report the scrap situation as being unsatisfactory.

Shortage Seen Due to Exports

Middletown, Ohio

••• Unless the flow of scrap from farm and factory can be expedited, there is danger of a material reduction in steel ingot production, below the rate possible if full scrap supplies are available, Charles R. Hook, president, American Rolling Mill Co., said last week. He asserted that the serious shortage of scrap was due to the exporting of some 20,000,000 tons between 1934 and 1940.

Armco's plants are operating at slightly in excess of full rated capacity, Mr. Hook said, and would continue to do so throughout the balance of the year, provided raw materials are available.

Auto Wreckers Meet

Columbus, Ohio

••• As a move toward stepping up the rate of scrapping of old automobiles, car wreckers in Ohio have formed the Ohio Committee on Auto Wrecking with the indorsement of defense agencies and the Institute of Scrap Iron and Steel. The auto wreckers have reported plans to employ additional labor to scrap old cars. Further meetings are scheduled to devise various means of increasing the flow of scrap from auto graveyards.

Despite Shortages, REA Obtains Steel, Aluminum, Zinc

Washington

• • • Perhaps one outstanding reason for the constant cries of shortages of most every conceivable material for defense is to be found in the civilian allocation OPACS announced last week for the Rural Electrification Administration. Reflecting a strong political flavor, OPACS sets up the thin pretext that "Extension of electric facilities in rural areas is of primary importance to the farm population and the carrying out of present plans of REC is considered by OPACS to be an essential contribution to the maintenance of public welfare and civilian morale."

Quantitatively the material to be provided for this activity is small but cumulatively large supplies are diverted to civilian use which if used for direct defense needs would relieve the shortage situation.

The program provides that during each of the six months beginning with August, 1941, the following amounts in short tons of material shall be allocated to REA: Copper, 4500; steel, 3100; zinc, 140; aluminum, 3.5. The allocations, OPACS said, shall be reduced in any month by (1) the quantities of materials allocated to REA for construction of defense projects; and (2) the quantities of aluminum which the REA is able to save by arranging to charge for power at a flat rate per month, thereby eliminating the need for meters, "which use a certain amount of aluminum."

A further stipulation is that REA will use the foregoing material to complete work now in progress and will not undertake any new projects unless the allocated materials are sufficient to complete such projects.

St. Louis Plant to Produce 1000 Gun Turrets Monthly

• • • Manufacture of gun turrets at the rate of 1000 monthly, said to be the fastest production at any plant in the world, is the goal of the new plant being built here for Emerson Electric Co.



Photo by Harris & Ewing

CHRISTMAS' TANKS: Tank production in the U. S. in little more than a year has reached a point which Germany attained in more than five years, Lieut. Col. John K. Christmas (above), reports. Col. Christmas, the Army's leading tank expert, is shown holding a model of a new light tank.



Photo by Wide World

CURTISS HAWK: Shown in flight for the first time is this newly-developed Curtiss Hawk P-40D pursuit plane, a large number of which have already been produced for the Army at Curtiss-Wright Corp.'s Buffalo plant.



Photo by International

PONTOON RACERS: Soldiers of the 101st Engineers at Boston recently raced these pontoon boats which usually are used by the Army for swing construction of bridges.

OPACS Keeps Upper Hand In Auto Dispute

Washington

•••Mum was the word on the jurisdictional dispute between OPM and OPACS when William S. Knudsen, OPM director general, emerged from the White House last Thursday. The issue, involving the automobile industry and the extent of production curtailment eventually to be ordered, has been placed before President Roosevelt, although the Chief Executive has attempted to minimize the controversy. It all started when Price Administrator Leon Henderson proposed a 50 per cent reduction.

Latest authoritative word to come from a badly-muddled picture is that automobile production in the first three months of the 1942 model year will be slashed beyond the 20 per cent cut originally set by Mr. Knudsen. Such a reduction below 600,000 passenger cars in August, September and October appeared probable after the July 29 conferences with members of the industry, which had been scheduled separately by OPM and OPACS, merged into a "love feast" with Messrs. Knudsen and Henderson acting as joint hosts.

Skeptics were prompt to characterize the luncheon merger as window dressing designed to gloss over and minimize the dispute. Deepening the first quarter cut

below the 20 per cent reduction originally proposed was taken to mean that OPACS, advocate of a 50 per cent curtailment to follow the three-month period, has the upper hand in a dispute which finds OPM opposing the more drastic reduction.

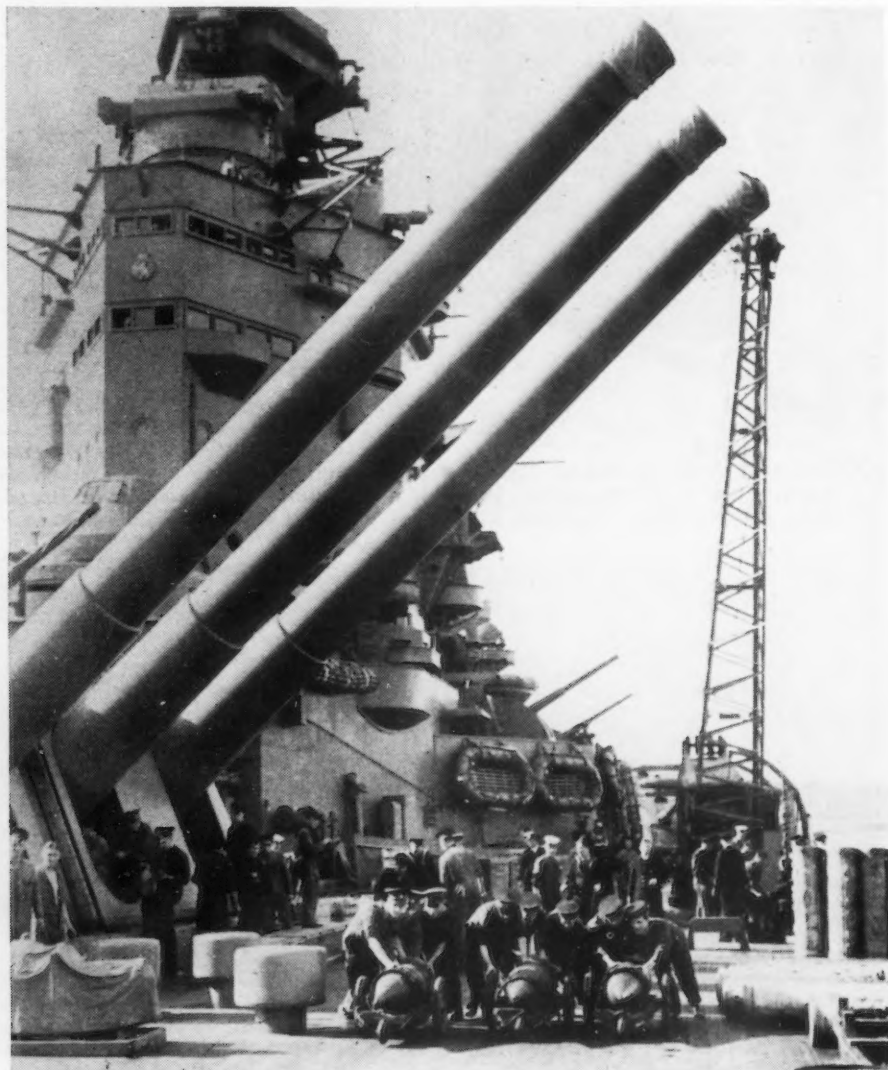
Presiding jointly, the hosts had honeyed words to say about the industry's cooperative spirit, although automobile manufacturers in recent weeks have found it increasingly difficult to cooperate in the face of incongruous maneuvers by the two competing government agencies. Messrs. Knudsen and Henderson promised that OPM and OPACS would further confer on the problem of reduced production, and announced "the general feeling of government representatives present that the industry's tentative production schedules were too high and would probably have to be adjusted."

The statement, regarded as significant and indicative of OPACS influence in the matter, was followed by the observation that all companies represented were working closely with OPM in an effort to secure additional defense contracts for their expanding organizations and productive facilities. The industry was asked to give further information on both truck production and the timing of the transfer of labor to the \$2,000,000,000 in defense work already undertaken by the automobile industry. Additional work aimed at the elimination of critical materials is being carried on by the industry even though it has made "an unusually fine record in substitution," it was said.

Assured that prompt action on allocations will be forthcoming just as soon as necessary information has been compiled by the government, industry representatives were told that they face a considerable volume of business during the coming model year. This statement was based on a preliminary canvass of business available to the industry through defense contracts, motor truck production, and passenger car production for which materials are likely to be available.

ONE-TON SHELLS FOR THE NELSON: One-ton 16 in. shells are being pushed along the deck of the H.M.S. Nelson in special shell carriers.

Photo by Wide World



"Special Quality"

TOOL and
ELECTRIC
FURNACE
ALLOY STEELS

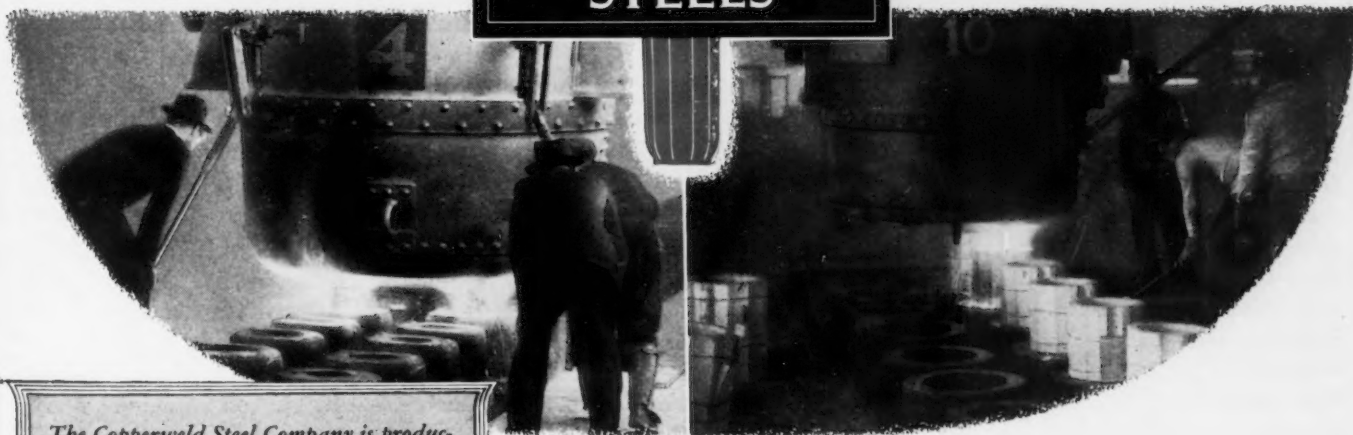
CARBON TOOL STEELS
ALLOY TOOL STEELS
CORROSION AND
HEAT RESISTING STEELS
SPECIAL AND FINE STEELS
STAINLESS STEELS
FREE CUTTING STAINLESS STEELS
NITRALLOY STEELS



"Steel Quality begins

**ARISTOLOY
STEELS**

in the Melt Shop"



The Copperweld Steel Company is producing the following Aristoloy Steels particularly for National Defense: RIFLE AND GUN BARREL QUALITY, GUN QUALITY, SHOT QUALITY, BULLET CORE AND AIRCRAFT QUALITY.

COPPERWELD STEEL COMPANY WARREN, OHIO
ARISTOLOY STEELS:

STAINLESS STEELS, CORROSION AND HEAT RESISTING STEELS, CARBON TOOL STEELS, ALLOY TOOL STEELS, SPECIAL AND FINE STEELS, NITRALLOY STEELS, AIRCRAFT QUALITY STEELS, BEARING QUALITY STEELS

\$3 Million in Dues Paid to Auto Union

Detroit

• • • Indications that members of the United Automobile Workers, (CIO) paid more than \$3,000,000 in dues during the year ended, April 30, are contained in a report of the International secretary-treasurer, George F. Addes. The report will be presented to the union convention in Buffalo, Aug. 4. The International, itself, collected approximately \$2,000,000 in dues and initiation fees. The 40 per cent per capita payment to the International union on each dollar of dues, totaled \$1,377,067, indicating total dues payments of approximately \$3,500,000.

The union's membership during the year increased 200,000 members to a paid-up total of 458,413, compared to 263,550 in April, 1940. The year's total income was 87.38 per cent over the previous year.

The largest single expense item spent for organization was \$138,914.07 for organizing Ford Motor Co. Addes recommended that

No More Tungsten for Horseshoes in Army

Washington

• • • There are many ways to conserve defense supplies. For its part the Army has decided to eliminate some frills and save a vital defense metal. Heretofore tungsten has been used in the calks of horseshoes. Now, says the Army, specifications do not require that metal and it can be used for more defense items.

a reserve fund of \$5,000,000, approximately \$10.00 per member, be built up as a "protection" fund to meet any period of industrial unemployment after the present defense boom has passed.

Recently the UAW-CIO and its rival the UAW-AFL agreed to use those names, respectively, and also split the office furniture and other properties which have been in dispute since Homer Martin, the former president, and George Ad-

British Tin Supplies Reported Adequate

• • • There is no shortage of tin in Great Britain and normal consumption is being fully maintained, according to William H. Tait, British tin expert, now on a visit in the U. S. Mr. Tait says that since the outbreak of the war the Tin Research Institute of London, of which he is technical development manager, has been engaged on war problems. Many special war industries are using tin for the first time or in unfamiliar ways. The tin institute has been called upon to solve many technological problems which have arisen during the course of such work.

des split in January, 1939. Since that time use of the UAW name, possession of the property and ownership of \$30,000 in bank accounts has been in dispute. The \$30,000 has been whittled away through various claims on it and what remains will go for attorneys' fees.

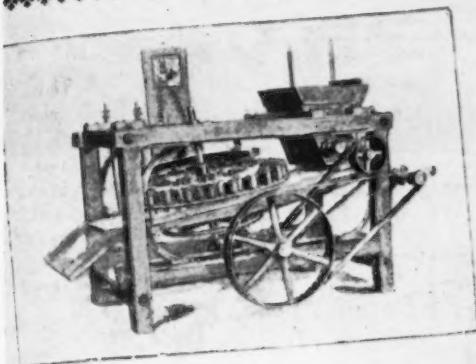
Production for Sale of Stainless Steel Products

(American Iron and Steel Institute figures for May, 1941)

	Number of companies	PRODUCTION FOR SALE—NET TONS					
		Current Month			Year to Date		
		Total	Shipments		Total	Shipments	
			Export	To members of the industry for conversion into further finished products		Export	To members of the industry for conversion into further finished products
Ingots, blooms, billets, slabs, sheet bars, etc.	12	5,851	232	5,165	24,738	287	22,811
Structural shapes (a)				x x x x x x			x x x x x x
Plates	6	449	2	-	2,361	18	30
Sheets—Hot rolled	10	4,268	78	228	20,136	406	752
Sheets—Cold rolled							
Strip—Hot rolled	4	194	-	125	1,822	-	1,473
Strip—Cold rolled	6	5,520	13	x x x x x x	22,744	132	x x x x x x
Bars—Hot rolled	15	3,868	742	799	17,889	2,133	3,676
Bars—Cold finished	7	1,818	170	x x x x x x	8,217	679	x x x x x x
Wire rods	5	573	-	213	2,134	10	793
Wire—Drawn	4	580	4	136	2,650	25	623
All other	7	547	25	116	4,137	147	626
TOTAL STAINLESS STEEL	24	23,668	1,266	6,782	106,828	3,837	30,784
ALL PRODUCTS— 4% TO 6% CHROMIUM	12	2,635	-	804	10,013	203	2,072

(a) Included in "All other."

"SEPARATION HEADQUARTERS



Modern Electro - Magnetic Separators

We build the only up-to-date Electro-Magnetic Separators on the market for separating

Iron from Brass Turnings, Borings, Etc.
Iron from Babbit Pillow-Block Facings.
Iron from Cupola Slag and Foundry Refuse
Iron from Anything that is Non-Magnetic

We have replaced Separators of nearly every other make with our machines, but have never heard of one of our Separators being replaced by any other. We build Electro-Magnetic Separators exclusively and lead the procession in this line. Write to us for circulars and list of prominent concerns that are using our Separators. :: ::

DINGS ELECTRO-MAGNETIC SEPARATOR
103 South Bay Street, * * * MILWAUKEE.

Since **1899"**

This
Advertisement
Appeared Dec. 12,
1900:



Modern Dings Equipment for the Metal Industries:

Metal Handling . . . Sand Con-
ditioning . . . Scrap Separation

MAGNETIC PULLEYS
PULLEY TYPE SEPARATORS
MAGNETIC DRUMS
DRUM TYPE SEPARATORS
REVOLVING DISC SEPARATORS
VIBRATING TRAY SEPARATORS
SPECIAL SEPARATORS
LIFTING MAGNETS
MAGNETIC CLUTCHES



Ask for
This Bulletin

"Magnetic Alchemy"—new bulletin on modern separators for the metal industries. Send for your copy now.

REPRODUCTION of the above Dings advertisement of 1900, one of the first ever published by the company, brings into sharp focus the words "Separation Headquarters Since 1899" carried on so many of Dings present-day advertisements.

Magnetic Separation in the metal industries was in its infancy when Dings developed the Type M Separator which became almost standard equipment in foundries. Many of these machines are still in service after 30 and 40 years.

Since 1899 Dings has taken the lead in supplying modern electro-magnetic separators to meet the changing requirements of the metal industries. Dings has been and still is the "World's Largest Exclusive Builder of Magnetic Equipment." Dings jealously guards this position by constantly offering improved equipment to industry and by building only the highest quality equipment, often bringing costly features to the user at no extra cost. These policies have earned Dings a big following and thousands of repeat-order customers. They are worth your consideration when you consider the purchase of magnetic equipment.

**DINGS MAGNETIC
SEPARATOR COMPANY**
516 E. Smith St., Milwaukee, Wis.

Dings
MAGNETIC
SEPARATION **HIGH
INTENSITY**



BELL'S BUFFALO PLANT: Aircobra planes are coming off two conveyORIZED assembly lines in this model Niagara Falls, N. Y., plant of Bell Aircraft Corp. Photo by Austin Co.

OPM Asks 100,000 Railroad Workers for Ships, Planes

Chicago

••• Transfer of 100,000 railway maintenance men to shipbuilding and aircraft production was requested of railroad labor and management by Eli L. Oliver, chief OPM labor advisor, at a meeting here. Sidney Hillman, OPM associate director, stated that aircraft payrolls must be increased five times during the next 12 months—representing an increase from

200,000 at present to 1,000,000 by July, 1942. Shipbuilding will have to increase from 375,000 to 555,600 in the same period, he said. At the meeting were J. J. Pelley, president of the Association of American Railroads; Bert M. Jewell, president of the Railway Employees' Department of the AFL; E. E. Milliman, president of the Brotherhood of Maintenance of Way Employees; and A. E. Lyon, president of the Brotherhood of Railroad Signalmen of America.

Defense Boom Increases Metal Workers by 42%

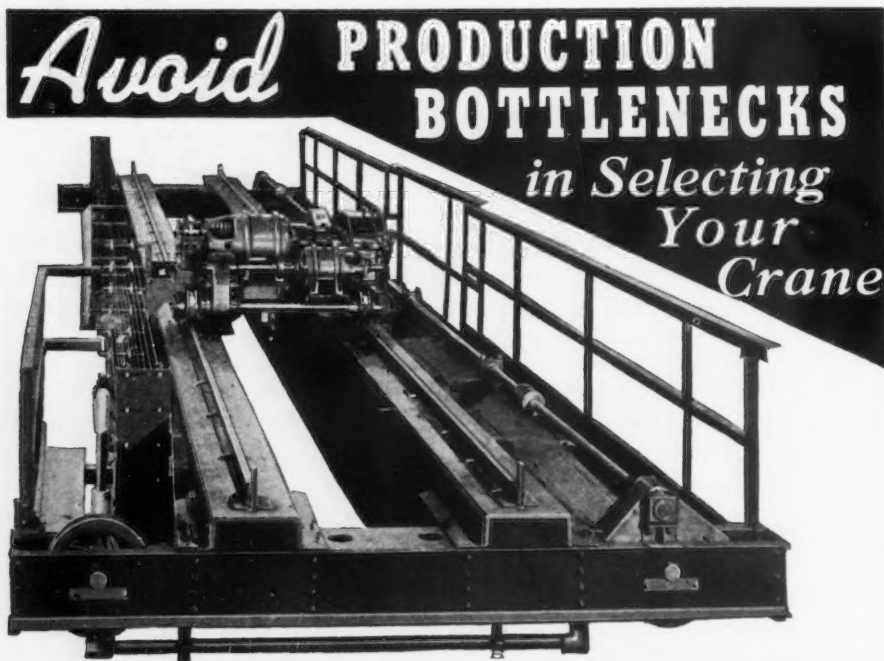
Chicago

••• Of the 1,252,000 employees in the metal working industries of the Seventh Federal Reserve District, more than 370,000 were added during the past year, as a result of the defense boom. The Federal Reserve Bank here reports that the additional workers have been drawn from the unemployed, from farms, and from the new labor supply arising each year. This is partly borne out by the decline in the supply of farm labor in relation to demand, with the ratio now at 70.6 per cent, as against 102 per cent a year ago. Construction contracts during the 1941 first half exceeded half a billion dollars and was not far below the \$600,000,000 for the same period of 1929. At the same time, consumers' goods activities have gone up sharply. Detroit and other cities have shown a 21 per cent year-to-year gain in consumer sales. On the other hand, living costs have risen 3.4 per cent.

With Pay Increased, Workers Strike for Bigger Bonus

Valparaiso, Ind.

••• Following distribution of a second quarter bonus of \$25 each, employees of the Indiana Steel Products Co., here struck, protesting that the bonus was not enough. About 200 workers walked off the job. Their first quarter bonus amounted to \$35.31. Company officials explained that the second quarter decline was traceable to wage increases granted in March and to setting aside larger reserves for taxes. Firm has about \$200,000 in defense orders for permanent magnets used in airplane motors and communication instruments. AFL has a closed shop contract with the company.



**EUCLID
CRANES
&
HOISTS**

Consistently fast movement of material and uncommonly dependable service have always been features of Euclid Cranes. They won't "bottleneck" your production through sluggish operation or in time-consuming adjustments or repairs.

Write for the New Catalog, just off the press.

THE EUCLID CRANE & HOIST CO.
1361 Chardon Rd. Euclid, Ohio

Illinois Industry Still Opposes Closed Shop, Check-Off

Chicago

••• Closed shop and check-off provisions in union contract obtained from the Ford Motor Co. will not serve as a precedent for Illinois industry, the Illinois Manufacturers' Association has told its members. Answering members' inquiries, the opinion was advanced that such union contracts lead to:

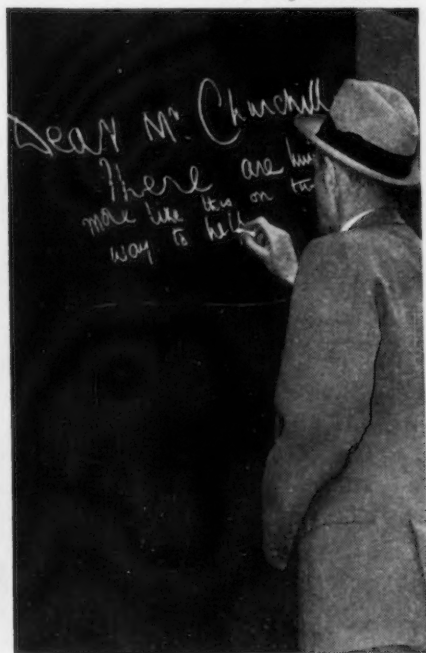
1. Delivery of interests of employees into the hands of the union.

2. Desertion of employees by management.

Closed shop agreements are followed by temporary eras of good feeling, but, the association's opinion continues, inevitably are then followed by more unreasonable demands as the union secures a dominant hold on the business. The "check-off" is one of the most un-American and destructive institutions in the country's commercial history. It provides a permanent source of revenue for financing union and political activities as well as a "jackpot" for corrupt labor agents.

DEAR CHURCHILL: Lord Halifax, British ambassador, is shown writing a note on the tail of a new Consolidated B-24 bomber about to leave San Diego, Cal., for England. The note read: "Dear Mr. Churchill: There are hundreds more like these on their way to help you finish the job."

Photo by International




**THEY'VE ALWAYS BEEN
A MEANS OF DEFENSE—
HUBBARD**

SPRINGS • STAMPINGS • WIRE FORMS

For more than 30 years Hubbard has been supplying dependable Parts Like These to thousands of manufacturers, to help defend the prestige of nationally known and accepted products. Hubbard Springs, Stampings and Wire Forms are made in any quantity, from all types of material, in sizes, shapes and forms to meet any kind of design or production problem, or mechanical application.

 **M. D. Hubbard Spring Co.**
318 CENTRAL AVE. • PONTIAC, MICH.

R & M FOR "Air Power"



Batteries of R & M hoists on an American Monorail system answer the call for speeding aircraft production in one of America's leading airplane plants. Above are two R & M units handling stratoliner hulls from production to assembly. Inset shows close-up view of 5-ton carrier.

GIVING wings to America . . . speeding output for vital defense industries . . . helping lift the load of production pressure everywhere . . . you'll find R & M hoists and cranes doing the job with uninterrupted service and minimum cost.

R & M hoists can solve *your* material-handling problem, whether it's making airplanes or cotter pins. They are designed to fit any make of monorail or I-beam track and oper-

ate at fast or creeping speeds with push-button or rope control.

R & M cranes are also built for every type of material-handling service. Optional two-speed control provides low operating speeds with simple, fool-proof equipment.

Call in an R & M expert to study your plant layout. He may save you thousands of dollars. Do it now by contacting your nearest R & M sales and service office listed below.

Albany . . . 364 Broadway
Atlanta . . . 319 Walton Bldg.
Baltimore, Lombard & Concord St.
Boston . . . 55 Long Wharf
Buffalo . . . 2005 Delaware Ave.
Chicago . . . 2400 W. Madison St.
Cincinnati . . . 418 New St.

Cleveland . . . 352 Rockefeller Bldg.
Dallas . . . 1110 Cadiz St.
Denver . . . 1420 16th St.
Detroit . . . 2921 E. Grand Blvd.
Houston . . . 3715 Harrisburg Blvd.
Jacksonville . . . 305 Bisbee Bldg.
Newark . . . 700 Bergen St.

Montreal . . . Lyman Tube & Supply Co., Ltd.

New York . . . 200 Varick St.
Philadelphia . . . 401 N. Broad St.
Pittsburgh . . . H. W. Oliver Bldg.
San Francisco . . . 237 Rialto Bldg.
Seattle . . . 216-17 Walker Bldg.
Syracuse . . . 204 State Tower Bldg.

ROBBINS & MYERS, Inc.
HOIST & CRANE DIVISION • SPRINGFIELD, OHIO
MOTORS • FANS • MOYNO PUMPS • FOUNDED 1878

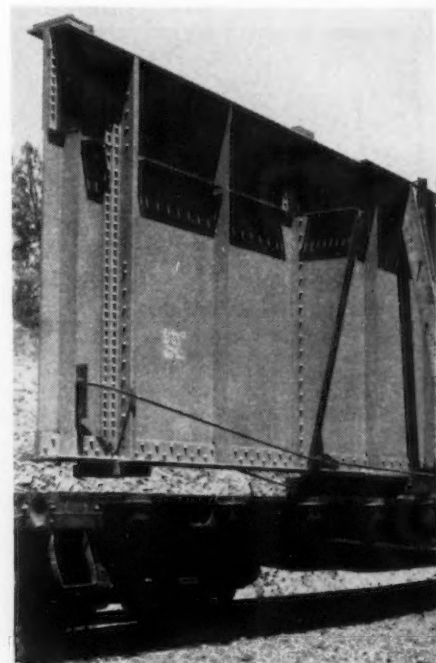
NEWS OF IND

Farm Equipment Makers Get Highest Civilian OPACS rating

Washington

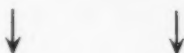
• • • A civilian allocation program providing that manufacturers of farm machinery and equipment be given the "highest civilian preference rating" for materials to be delivered during August, September, and October, but that these materials shall not amount to more than 20 per cent above the quantity used during the corresponding period of 1939 or 1940, whichever was higher, was issued recently by OPACS Administrator Leon Henderson. He said that the program, which is to be administered by the OPM Priorities Division, is designed to insure an adequate supply of raw materials for manufacture of farm machinery needed for maintenance of the nation's food supply and to avoid working a hardship on the country's farmers. The program provides that the preferences granted shall not be used to accumulate inventories. Furthermore, manufacturers are required to conserve critical materials and to plan production in accordance with the national need for different kinds of farm equipment. In

154 FT. GIRDER: One of the ever to be transported by rail to the United States Bureau of installation on the Pit River ect. The girder, 154 ft. long tons and required three flat a twin will support a highway the bridge.



submitting requests for priority ratings, manufacturers must attach statements of how they intend to comply with these requirements.

A conference on July 24 between representatives of leading farm implement manufacturers developed the information that material shortages, principally in steel, are threatening the current production rate of certain equipment. Because the raw materials situation is likely to become worse rather than to improve over the next three months, farm implement makers were urged by OPACS officials to stimulate the maintenance and repair of existing equipment and to use substitutes.



Washington

••• May exports of farm implements and machinery totaled \$8,309,217, a 13 per cent decline below the May, 1940, figure of \$9,555,833. Exports of tractors declined 9 per cent; and wheel tractors dropped to \$2,405,123 compared with \$3,131,052 in May last year.

largest pieces of fabricated steel has been shipped from Gary, Ind., Reclamation at Redding, Cal., for bridge of the Central Valley project and almost 12 ft. high, weighed 97 cars for shipment. This girder and approach span on the south end of



QUALITY MATERIALS *by Standard*

Standard Steel Works Division of The Baldwin Locomotive Works traces its origin to the Freedom Forge which was established at Burnham, Pa., in 1795. For many years Standard's 119-acre plant at Burnham, Pa., has kept pace with modern developments in the manufacture of steel products.

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Division of THE BALDWIN LOCOMOTIVE WORKS
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THE MIDVALE COMPANY • CRAMP BRASS AND IRON FOUNDRIES DIVISION



Government Awards

War Dept., Ordnance:

Ahlberg Bearing Co., Chicago; bearings	\$2,190
Ajax Electrothermic Corp., Trenton, N. J.; furnace	10,232
Allis-Chalmers Mfg. Co., Springfield, Ill.; tractors	42,368
Aluminum Co. of America, Garwood, N. J.; windshields	6,068
American Brake Shoe & Foundry Co., American Forge Division, Chicago; forgings, steel	638,600
American Brass Co., Waterbury, Conn.; brass rod	3,438
American Chain & Cable Co., Inc., Reading-Pratt & Cady Division, Bridgeport, Conn.; gate valves	1,890
American Fork & Hoe Co., Charleston, W. Va.; single bits, chopping axes	6,200
shovels	7,900
American Smelting & Refining Co., Federated Metals Division, Newark; bismuth solder	2,976
American Steel & Wire Co., Cleveland; steel	2,352
nails	5,251
Armstrong Brothers Tool Co., Chicago; extensions and wrenches	2,117
Autovent Fan & Blower Co., Chicago; exhaust and ventilating systems	2,380
Axelson Mfg. Co., Los Angeles; lathes, engine	6,598
B. G. Corp., New York; elbow assemblies for tanks	4,256

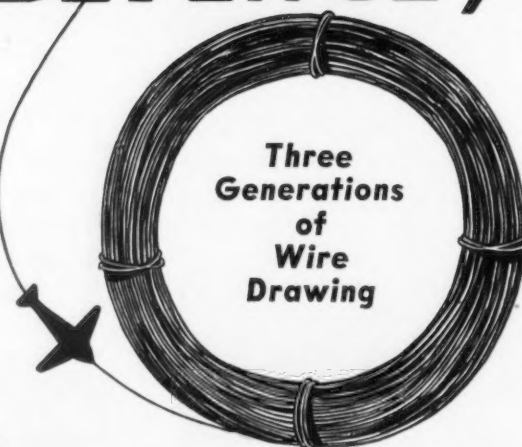
Bailey Products Corp., Union City, Ind.; housings, for shells	125,860
Barwood & Co., Philadelphia; tools	1,925
Bay State Abrasive Products Co., Westboro, Mass.; wheels, grinding	1,667
Bearings Co. of America, Lancaster, Pa.; bearings	9,237
Bendix Aviation Corp., Eclipse Aviation Division, Bendix, N. J.; assemblies, ignition and shields starters	6,692
2,760	
Bendix Aviation Corp., Eclipse Machine Division, Elmira, N. Y.; shell assemblies	405,000
Bendix Aviation Corp., Scintilla Magneto Division, Sidney, N. Y.; magnetos, scintilla parts for tanks	2,600
magneto parts	2,325
Bethlehem Steel Co., Bethlehem, Pa.; steel, nickel	3,510
Birdsboro Steel Foundry and Machine Co., Birdsboro, Pa.; castings, steel	93,836
E. W. Bliss Co., Brooklyn; parts for machine and crankshafts	2,600
press, trimming	56,723
Bohn Aluminum & Brass Corp., Detroit; forgings	82,145
Boyt Harness Co., Des Moines; towing equipment and pack load accessories	18,333
Breeze Corp., Inc., Newark; manifolds, engine radio shield assembly	14,000

starter breeches	4,050
parts for starter	1,720
Bridgeport Brass Co., Bridgeport, Conn.; cartridge cases	2,750
Brown & Sharpe Mfg. Co., Providence; machines, grinding and milling	68,711
blades, turning	2,304
gages	3,303
Budd Wheel Co., Detroit; nuts, caps, hub assemblies, automobile wheels, studs, brake drums and wrenches	16,997
Buffalo Forge Co., Buffalo; machine, forge shop work	3,075
Bulova Watch Co., New York; shafts, pins and pinions	28,357
C. O. Carlson, Inc., New York; steel, chrome nickel	2,406
Carnegie-Illinois Steel Corp., Gary Works, Gary, Ind.; steel	90,253
Cedar Rapids Engineering Co. of Delaware, Cedar Rapids, Iowa; machines, cylinder boring	3,744
Chase Brass & Copper, Inc., Waterbury, Conn.; cups, case, cartridge, brass	140,562
Chemurgic Corp., Richmond; primers	48,585
Christy Park Works, McKeesport, Pa.; projectiles	14,625
Clearing Machine Corp., Chicago; cylinders	1,902
Continental Motors Corp., Muskegon, Mich.; cones, couplings, pins, throwers and units	3,488
engine parts	35,087
Crane Co., Philadelphia; pipes	5,807
Crucible Steel Co. of America, Midland, Pa.; steel bar	17,331



In more ways than you can imagine, Johnson wire is aiding direct and indirect defense production. The direct aid consists of supplying primary and sub-contracts with every grade of steel wire from soft to high carbon steel.

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GOVERNMENT AWARDS



FORD BOMBER PLANT: Construction crews are working at top speed on this new defense project, the \$47 million bombing plane factory Ford Motor Co. is building at Willow Run, Mich. The structural framework of the big "L" shaped plant will contain 25,000 tons of steel. The plant, when completed next year, will produce Consolidated B-24D bombers and sub-assemblies. Total floor space, including hangars, will be 3,700,000 sq. ft.

James Cunningham Son & Co., Rochester, N. Y.; assemblies, carriage	124,087	Duro Metal Products Co., Chicago; wrenches	4,920	Electric Boat Co., Bayonne, N. J.; motors	4,148
Duriron Co., Inc., Dayton, Ohio; cocks, plug	3,845	Dutton-Lainson Co., Manufacturing Division, Hastings, Neb.; guns, oil	6,310	Ex-Cell-O Aircraft & Tool Corp., Detroit; grinders, thread	33,459
				Faribault Machine Shop & Foundry,	

**38
YEARS
IN
EXPORT**



**30
CHURCH
ST.
NEW YORK**

GOVERNMENT AWARDS

Faribault, Minn.; stands, welding	1,928
Fellows Gear Shaper Co., Springfield, Vt.; machines, gear bur-	
nishing	5,314
A. Finkl & Sons Co., Chicago; forgings, alloy steel	5,200
Fosdick Machine Tool Co., Cincinnati; machine, drilling	8,494
General Motors Corp., Chevrolet Motor Division, Detroit; spare parts for trucks	64,600
General Motors Sales Corp., New Departure Division, Bristol, Conn.; bearings	1,652
General Tool Sales Co., Philadelphia; tools	1,800

Gisholt Machine Co., Madison, Wis.; equipment for turret lathes	55,400
Globe-Union, Inc., Milwaukee; fuzes	720,000
Grayson Heat Control, Ltd., Lynwood; fuzes	130,000
Great Lakes Steel Corp., Ecorse, Detroit; steel	13,233
Hajoca Corp., Philadelphia; steel pipe and fittings and water coolers	5,900
Hannifin Mfg. Co., Chicago; tools	150,000
Louis Hanssen's Sons, Davenport, Iowa; screws, funnels, wrenches	5,827
Harding Machine Screw Co., East Liberty, Ohio; primers	86,338

Heald Machine Co., Worcester; machines, grinding	23,907
Heller Brothers Co., Newark; hammers	2,464
Hercules Powder Co., Kenil, N. J.; assemblies, propellant increment	2,355
Highway Trailer Co. of Pa., Edgerton, Wis.; semi-trailer	1,870
F. Hohlfelder Co., Cleveland; bands, seamless	48,510
Houghton & Richards, Inc., Boston; steel	1,979
Illinois Tool Co., Chicago; gears	2,763
Industrial Gas Engineering Co., Inc., Chicago; exhausters, air ..	1,694
International Business Machine Corp., Rochester, N. Y.; fuzes ..	188,240
International Harvester Co., Chicago; packing stop for containers	738,354
tractors	7,728
J.C.H. Automatic Machine Works, Philadelphia; dies	1,855
Jones & Lamson Machine Co., Springfield, Vt.; lathes, turret, comparator	14,181
machines, grinding	11,665
Joslyn Co., Baltimore; racks, underground cable	26,009
Keenan Supply Co., Philadelphia; install deep steel tank	3,501
A. Landau Co., Philadelphia; tools ..	1,522
Liberty Tool and Die Corp., Rochester, N. Y.; dies	2,592
Lindberg Engineering Co., Chicago; furnace, electric	16,800
McCord Radiator & Mfg. Co., Detroit; liners and suspensions ..	2,160
helmet body assys.	1,821,720
Magnus Tool and Die Co., Newark; tools	1,393,650
Majestic Tool & Mfg. Co., Detroit; machines, grinding	3,850
Marchant Calculating Machine Co., Oakland; fuzes	11,557
Marlin-Rockwell Co., Jamestown, N. Y.; ball bearings	219,700
Mayer and Oswald, Inc., Chicago; hoists	3,420
Moore Special Tool Co., Inc., Bridgeport, Conn.; grinder, precision jig	1,523
dies	8,397
Morse Twist Drill and Machine Co., New Bedford, Mass.; taps ..	2,980
Conrad E. Muhly, Inc., Lansdowne, Pa.; strainers, traps and expansion joints	1,984
National Pneumatic Co., Rahway, N. J.; boosters	1,507
National Wire & Cable Co., Pittsburgh; wire and conduit	362,880
Niles-Bement-Pond Co., Pratt and Whitney Division, Hartford; gages	1,734
micrometers	20,728
blocks, precision gage, micrometers, lathes and drilling machine tables, rotary	3,520
Norton Co., Worcester; wheels, diamond grinding	14,729
Nun Mfg. Co., Evanston, Ill.; shells	4,950
Ohio Brass Co., Mansfield, Ohio; primers	2,532
Oliver Farm Equipment Co., Chicago; shells	192,587
Precise Tool and Mfg. Co., Farmington, Mich.; inspection gages ..	340,000
Prescott Co., Menominee, Mich.; lathes	648,050
C. J. Rainear & Co., Inc., Philadelphia; pipes and fittings	3,350
W. B. Rapp Machine Co., Philadelphia; lathes, shaper, grinder and arbor presses	4,500
Rivett Lathe and Grinder, Inc., Brighton, Boston; grinder	1,673
Rockford Machine Tool Co., Rockford, Ill.; shaper	6,945
John A. Roebing's Sons Co., Trenton, N. J.; wire rope	3,969
Joseph T. Ryerson and Son, Inc., Chicago; steel	3,465
	1,775
	2,290



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GOVERNMENT AWARDS

Savage Arms Corp., Utica, N. Y.; machine guns	14,334,470
Scovill Mfg. Co., Waterbury, Conn.; cups, case, cartridge, brass	449,525
Sheet Metal Products, Inc., Newark; hoppers, elevators; chutes, transfer; and pipes	15,648
Sheffield Corp., Dayton, Ohio; machines, gaging and weighing	96,000
gages	5,357
E. H. Sheldon & Co., Muskegon, Mich.; cabinets, laboratory tables and sinks	1,871
Sieg Company, Davenport, Iowa; wrenches and adapters	50,050
Simplex Wire & Cable Co., E. Cambridge, Mass.; cable, portable ..	1,845
A. O. Smith Corp., Milwaukee; bomb bodies	3,228,500
L. C. Smith & Corona Typewriters, Inc., Syracuse, N. Y.; primers, percussion	46,116
Snap-On Tools Corp., Kenosha, Wis.; sockets and wrenches ..	5,925
Specialty Engineering Co., Philadelphia; testing equipment	4,764
Standard Pressed Steel Co., Jenkintown, Pa.; parts for cabinet, tools, benches, bar rack, shelving	3,094
Standard Tube Co., Detroit; shells ..	1,098,000
Sterling Products Co., Moline, Ill.; screw drivers and wrenches ..	1,943
Stewart-Warner Corp., Chicago; oil and lubricating guns, fittings and hoses	1,953
fuzes and parts	2,659,276
Strong Steel Foundry, Buffalo; steel castings	237,220
Superior Steel Corp., Carnegie, Pa.; steel	79,394
Taft-Peirce Mfg. Co., Woonsocket, R. I.; gages, inspection	5,100
parts for hand tools	2,723
Timken Roller Bearing Co., Canton, Ohio; roller bearings	16,800
Tredegar Co., Richmond; projectiles	125,852
J. C. Ulmer Co., Cleveland; inspection gages	6,232
Unique Specialties, Inc., New York; rings, screw for fuzes ..	1,924
United States Gauge Co., Sellersville, Pa.; gages, pressure	9,151
U. S. Metals Refining Co., Carteret, N. J.; solder	3,975
U. S. Steel Export Co., Dunkirk, N. Y.; steel	6,429
Vanadium-Alloys Steel Co., Latrobe, Pa.; tool steel	1,551
Veit and Young, Philadelphia; punches	14,400
Vinco Corp., Detroit; gages, inspection	1,810
Waltham Watch Co., Waltham, Mass.; pins, escapement	23,197
Warner Electric Brake Mfg. Co., Beloit, Wis.; armatures, brake bands, magnet assemblies and springs	5,471
Warren Webster Co., Camden, N. J.; boosters	320,000
Morris Wheeler & Co., Inc., Philadelphia; floor plate	3,648
Wiedemann Machine Co., Philadelphia; gages	4,911
Willys-Overland Motors, Inc., Toledo, Ohio; shells	480,000
Alan Wood Steel Co., Ivy Rock, Pa.; steel floor plates	1,901
Wright Aeronautical Corp., Paterson, N. J.; discs, timing	1,500
engine parts	12,685
tools	1,512
Zeh & Hahnemann Co., Newark; press, tapering	7,600
Zimmerman Steel Co., Bettendorf, Iowa; steel	9,922
War Dept., Air Corps:	
Air Associates, Bendix, N. J.; bolts ..	\$251,797
Air Conditioning & Refrigeration Supplies, Inc., Charleston, W. Va.; stand assemblies	57,940

Aluminum Co. of America, Washington; various items of aluminum	91,955
American Chain & Cable Co., Inc., American Cable Div., Wilkes-Barre, Pa.; cable, steel	232,394
American Smelting and Refining Co., Whiting, Ind.; bronze, ingot ..	1,830
American Steel & Wire Co., Columbus, Ohio; cable	202,270
Ampco Metal, Inc., Milwaukee; bronze, aluminum rod	7,591
Bell Aircraft Corp., Buffalo; tanks ..	72,174
Bendix Aviation Corporation, Eclipse Aviation Division, Bendix, N. J.; starter assemblies	5,561,200

Chase Brass & Copper Co., Inc., Waterbury, Conn.; brass rods and bars	66,219
Chicago Pneumatic Tool Co., Detroit; riveters, pneumatic	94,275
Colson Corp., Elyria, Ohio; cradle assemblies	232,010
Crescent Tool Co., Jamestown, N. Y.; wrenches	61,586
Ditto, Inc., Chicago; duplicating machine supplies	139,323
Duquesne Smelting Corp., Pittsburgh; bronze, ingot	2,210
Dzus Fastener Co., Inc., Babylon, N. Y.; grommets and cowlings fasteners	61,071



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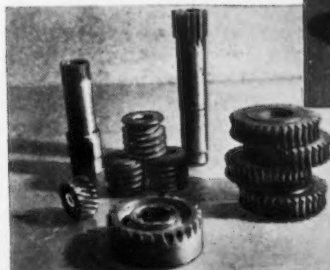
AMPCO METAL is without equal for its great strength—for its remarkable resistance to wear, impact, fatigue and corrosion. Government specifications in copper base alloys are met daily at AMPCO. It makes good where all other metals fail. Let us send you complete data suggesting possible applications of AMPCO METALS to your uses.

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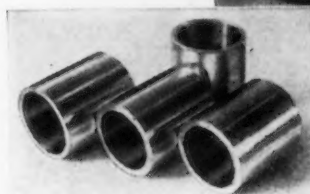
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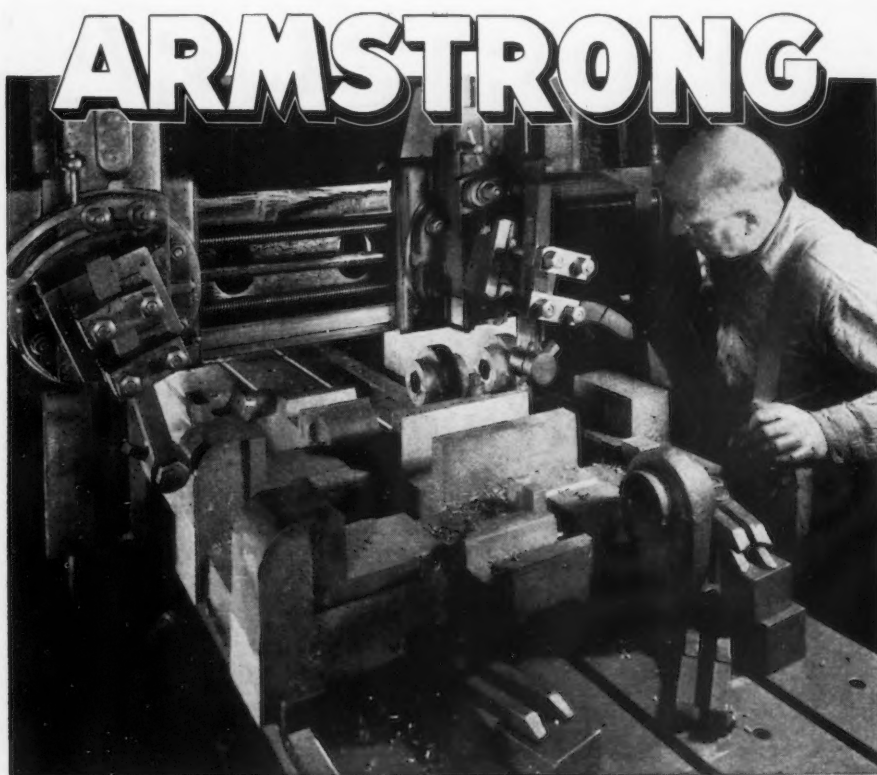
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GOVERNMENT AWARDS

E. W. Ferry Screw Products, Inc., Cleveland; bolts	85,261	Hinsdale Manufacturing Co., Chi- cago; socket wrenches	51,874
General Bronze Corp., Long Island City, N. Y.; cradle assemblies ..	54,600	Independent Engineering Co., Inc., O'Fallon; plant, oxygen generat- ing	57,000
General Motors Corp., Allison Di- vision, Indianapolis; tools and kits	272,293	Jacobs Aircraft Engine Co., Potts- town, Pa.; aeronautical engines.	6,006,577
General Motors Corp., Delco Prod- ucts Division, Dayton, Ohio; landing gear assemblies	1,174,250	Kay Products Co., Detroit; cradle assemblies	59,750
General Motors Corp., Harrison Radiator Div., Lockport, N. Y.; regulator assemblies	45,990	Kennedy Mfg. Co., Van Wert, Ohio; kits, tool	85,744
Gilbert Brass Foundry Co., St. Louis; bronze castings	7,961	Lockheed Aircraft Corp., Burbank, Calif.; spare parts	123,023
		Manning, Maxwell & Moore, Inc., Jersey City; reamers	22,674



ARMSTRONG PLANER TOOLS

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With an ARMSTRONG Planer Tool for each planer head, you can start any planer job without waiting to "tool-up," for "tooling-up" is reduced to selection of cutters, adjustment of cutter angle and clearance and tightening the set nut. These permanent, all-purpose tool holders take cutters quickly ground from standard high speed steel "squares" or "flats." They hold cutters at any angle . . . right or left . . . and at any clearance, always permitting the most efficient approach to the cut. They hold cutters ahead of center for extreme rigidity, or behind center when "gooseneck" tool is wanted, as for keyways or for heavy cuts on especially tough steel. Because of the extreme adjustability of these tools, it is often possible to complete jobs requiring top and side planing, under-cutting and, sectional interrupted cuts without moving work on the bed of the planer. It is the most efficient planer tool obtainable for all planer operations, except where extremely large areas are to be surfaced. For large surfaces, the ARMSTRONG Gang Planer Tool is recommended, for it will cut planing time as much as 60%.

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National Twist Drill & Tool Co., Detroit; reamers	3,850
Pump Engineering Service Corp., Cleveland; pump assemblies	466,041
Republic Drill & Tool Co., Chi- cago; drills	147,568
Reynolds Metals Co., Louisville, Ky.; various items of aluminum	253,637
John A. Roebling's Sons Co., Tren- ton, N. J.; cable steel	288,713
Seifreut-Elstad Machinery Co., Day- ton, Ohio; hammer machines ..	59,550
Seymour Mfg. Co., Seymour, Conn.; bronze rods, strip	5,612
Singer Sewing Machine Co., New York; sewing machines	144,962
Snap-On Tools Corp., Kenosha, Wis.; socket wrenches	366,573
Sparks-Withington Co., Jackson, Mich.; hoist assemblies	718,648
Standard Steel Works, North Kan- sas City; box assemblies	96,846
Stewart-Warner Corp., Chicago; heaters, ground, portable	428,000
Thompson Products, Inc., Clevel- and; pumps	109,655
United Aircraft Products, Inc., Dayton, Ohio; regulator assem- blies	81,814
United States Electrical Tool Co., Cincinnati; drills, electric, port- able	58,970
War Supplies, Ltd., Ottawa, Cana- da; advanced trainers with spare parts and technical data.	12,604,100
British-type Link trainers for instrument flying and landing..	2,132,250
Primary trainers with spare parts and technical data	1,234,570
Watervliet Tool Co., Inc., Albany, N. Y.; reamers	10,379
J. H. Williams & Co., Buffalo; socket wrenches	422,794
Yale & Towne Mfg. Co., Stamford, Conn.; pumps and motors	185,294

Defense Plant Building:

Atlantic Basin Iron Works, Inc., Brooklyn; facilities for repairing naval vessels	\$1,000,000
Champion Machine & Forging Co., Cleveland; plant and equipment for mfr. of steel forgings for aircraft struts and engines	2,699,680

GOVERNMENT AWARDS



ment of the Second Armored Divi-
Fort Benning, Ga., for shipment to
ana.

Ellis W. Barker, Salt Lake City, Utah; inert ammunition build- ing	53,500
James I. Barnes Constr. Co., Santa Monica, Cal.; depot armament fire control supply and repair bldg.	132,430
Barnes Mfg. Co., Mansfield, Ohio; pumping sets	54,750
Bay City Shovels, Inc., Bay City, Mich.; new crawler type drag- line	9,308
Bechtel-McCone-Parsons Corp., Los Angeles; central steam plant ..	199,200
Bethlehem Steel Co., Bethlehem, Pa.; structural steel	235,500

John Bowen Co., Boston, Mass.; motor repair shops, grease in- spection racks, oil houses, wash racks	178,000
Donald H. Breen, Watertown, N. Y.; sewer mains, water mains, storm drainage	7,947
Arthur Brown & Bro., New York; scales	2,941
Charles Bruning, Inc., New York; cases, steel sectional	4,086
Bucyrus-Erie Co., Evansville, Ind.; scraper and push bumper	3,782
B. B. Buell & Co., Seattle; kitch- en ranges	14,907

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*Murray Patents: U. S. Patents 1475859, 1924671; Canadian Patents 252874, 258068.

Crucible Steel Co. of America, New York; machinery and equipment for mfr. of artillery shells	1,000,000
Emerson Electric Mfg. Co., St. Louis; plant and equipment for mfr. of gun turrets	10,529,173
McDonnell Aircraft Corp., Robert- son, Mo.; plant for mfr. of air- craft parts	19,770
Metal Cutting Tools, Inc., Rock- ford, Ill.; machinery and equip- ment for mfr. of metal cutting tools	250,000
Todd Seattle Dry Docks, Inc., Seat- tle; facilities for conversion and repair of naval vessels	1,000,000

War Dept., Other Agencies:

Adams Motor Co., Mobile, Ala.; pick-up trucks	\$11,240
Alban Tractor Co., Moline, Ill.; disk plow, plow, tractor	16,374
Allis-Chalmers Mfg. Co., Milwau- kee; loader	26,157
American Chain Link Fence Co., Medford, Mass.; fencing	16,194
American Screw Co., Providence; screws	12,615
American Steel & Wire Co. of N. J., Cyclone Division, Newark; fence and gates	81,036
American Steel and Wire Co., Washington; nails	95,305
American Type Founders Sale Corp., Mt. Vernon, N. Y.; presses, lithographic	12,998
Ames Baldwin Wyoming Co., North Easton, Mass.; shovels ..	40,112
Aqua Systems, New York; gaso- line storage facilities	42,522
Arkansas Foundry Co., Little Rock, Ark.; fencing and illumination ..	79,908
Armstrong Bros. Tool Co., Chi- cago; pipe and fittings	9,197
C. W. Arnold, Inc., Trenton, N. J.; gasoline bulk storage & dis- pensing system & appurtenant water systems	78,977
Autocar Co., Ardmore, Pa.; spare parts for trucks	85,745
Baker Iron Co., Minneapolis; fencing	10,438
Bakker and Robinson, San Ber- nardino, Cal.; hangars	242,740



Greater Tonnage
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TANK BUSTER: This new T-12 half-track mobile mounted 75-mm. field gun, is shown being tested after rolling off the assembly line at the Autocar Co.'s Ardmore, Pa., plant.

Bunting Hardware Co., Kansas City; drill presses	8,664	Ford Motor Co., Dearborn, Mich.; engines	88,033
Burge Fence & Iron Co., Kansas City; fencing and illumination	7,710	S. Froehlich Co., Inc., New York; nailheads	8,330
Caldwell Foundry and Machinery Co., Inc., Pascagoula, Miss.; cast steel pump shell and cast steel impeller	3,255	D. E. Fryer & Co., Seattle; partitions, metal	2,850
Caterpillar Tractor Co., Peoria, Ill.; presses, compressors, pullers, sprocket	2,000	General Electric Co., Shenectady; locomotive	26,800
marine, diesel engines	5,849	General Motors Corp., Chevrolet Division, St. Louis; trucks	23,951
motor graders, tractors	83,392	A. J. Goerig, Seattle; railroad spurs	93,000
Central Engineering and Construction Co., Indianapolis; railroad spur	14,450	James Graham Manufacturing Co., San Francisco; ranges	11,683
Chell & Anderson, Chicago; construction of ordnance repair shop and boiler house	68,980	Great Eastern Construction Co., Inc., New York; hospital elevator	17,060
Chicago Bridge & Iron Co., Houston; steel water tanks and appurtenant facilities	86,580	Highway Trailer Co., Edgerton, Wis.; semi-trailers	86,948
Clyde Iron Works, Inc., Duluth; steam hoisting engine	1,960	C. A. Hooper, Madison, Wis.; pump	2,500
Colt's Patent Fire Arms Mfg. Co., Hartford; dishwashers	11,960	International Harvester, Chicago; parts for trucks	172,219
Darby Products of Steel Plate Corp., Kansas City; elevated water tanks and appurtenant facilities	59,434	Kansas City Wire & Iron Works, Kansas City; fencing	5,496
Deckert and McDowell, Chicago; railroad track	196,611	Langdon-Faulkner Co., Inc., Seattle; steel boilers	6,011
DeVan Motor Co., Mobile, Ala.; station wagons	4,950	Layne & Bowler, Inc., Memphis, Tenn.; pumping sets	4,824
Dicke Tool Co., Inc., Downers Grove, Ill.; wire	4,312	Leck Construction Co., Minneapolis; construction of two standard magazines	2,950
W. J. Distell, Los Angeles; ordnance bldgs. and appurtenant facilities	307,450	Lewis Refrigeration & Supply Co., Seattle; conversion equipment for ice-cooled refrigerators	3,230
Dohrmann Hotel Supply Co., San Francisco; coffee urns and battery; steam jacketed kettles and roasting kettles	25,861	Luffkin Rule Co., Saginaw, Mich.; tapes, steel	9,897
puree mixers	9,970	Mack Truck Co., Allentown, Pa.; truck assemblies	149,586
Edward H. Ellis, Inc., Westville, N. J.; portable steel igloo type magazines	45,865	E. H. Marhoefer, Jr., Co., Chicago; construction of water treatment plant	178,858
Equitable Equipment Co., Inc., New Orleans; steel cargo barge and steel gasoline barge	46,600	Marra & Son Construction Co., Inc., Indianapolis; water softening plant, pump house, water tower foundations, water and sewer systems	86,780
cargo vessels & tugs	640,000	J. O. and C. U. Martin, San Francisco; burners, boilers and tanks	7,309
Fargo Motor Corp., Detroit; automobiles	6,552	McGowan Lyons Hardware & Supply Co., Mobile, Ala.; electric cable	13,497
Flour City Ornamental Iron Co., Minneapolis; trestles, hoists and chests	80,940	McClung-Logan Equipment Co., Inc., Baltimore; tractor equipped with bulldozer	3,915

Thos. McQueen, Forest Park, Ill.; reinforced concrete bridge	53,100
Midland Structural Steel Co., Cicero, Ill.; structural steel	2,488,290
Gerald Mora Contractor, Houston; airport fence	4,970
National Cast Iron Pipe Division, James B. Clow & Sons, Kansas City; cast iron water pipe	5,035
H. B. Nicholson, Los Angeles; control tower and night lighting vault	24,600
New England Sales Corp., Providence; refrigerators	2,737
Northern Commercial Co., Cedar Rapids, Iowa; parts for bulldozers	2,168
Northern Commercial Co., Seattle; wire rope	2,787
O'Driscoll & Grove, Inc., New York; construction of standard ordnance shop, boiler house	109,748
Arthur J. O'Leary & Son Co., Chicago; bolts, bolt machine and nuts	11,923
Olson Construction Co., Dobson & Robinson, Peter Kiewit Sons Co., Ogden, Utah; shell loading, fuse loading and primer loading plants	2,305,000
Osgood Company, Marion, Ohio; cranes and spare parts	14,201
Ottinger Bros. Construction Co., Oklahoma City; construction of five ordnance buildings	81,080
Packard Motor Car Co., Detroit; cars, sedan	19,196
Page Steel & Wire Division, American Chain & Cable Co., Indianapolis; fencing and illumination	10,040
Paving Supply and Equipment Co., Milwaukee; pumps	4,103
Pearson Construction Co., Inc., Benton Harbor, Mich.; motor repair shops and oil house	73,995
J. C. Pitman & Sons, Inc., Lynn, Mass.; deep fat fryers	6,342
Pittsburgh-Des Moines Steel Co., Des Moines, Ia.; elevated steel water tank and appurtenant facilities	53,775
H. K. Porter, Inc., Everett, Mass.; wire cutters	64,548
G. E. Prentice Mfg. Co., New Britain, Conn.; buckles and clips	14,565
John A. Roebling's Sons Co., Trenton, N. J.; wire rope	3,898
Scheinert Bros., Inc., New York; screws	15,635
J. Slotnik Co., Boston; motor repair shops, gasoline stations and pontoon shed	93,714
L. B. Smith Motor Co., Lemoyne, Pa.; pickup trucks, station wagons	2,940
Spiniello Construction Co., Newark; sewage pumping stations and treatment plant pipe lines, etc.	199,301
Thos. Somerville Co., Washington; pipe fittings	25,521
Southern Railway Co., Washington; railroad cars	29,000
Studebaker Corp., South Bend, Ind.; chassis	40,773
Trewhitt-Shields & Fisher, Fresno, Calif.; 3 hangars, control tower and appurtenant facilities	648,900
Tulsa Rig, Reel & Mfg. Co., Tulsa, Okla.; temporary shop facilities, etc.	316,100
United States Steel Export Co., New York; three steel hopper barges	45,000
Virginia Bridge Co., Roanoke, Va.; bridge, steel, portable	187,394
Jack Walton Co., Houston; oil storage system	15,536
Webster & Webster, East Hartford; fence and gates	38,813
J. H. Weil & Co., Philadelphia; pens, drawing	4,110
Wheeling Steel Corp., Wheeling; sheets, terneplate	1,906
Winter-Weiss Co., Denver; semi-trailers	90,675

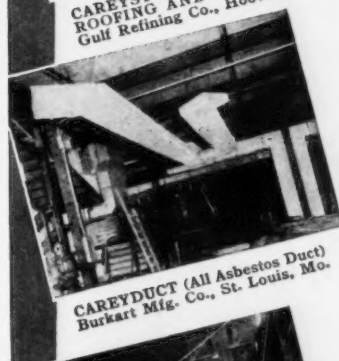
★ AID NATIONAL DEFENSE ★ CONSERVE VITAL RESOURCES

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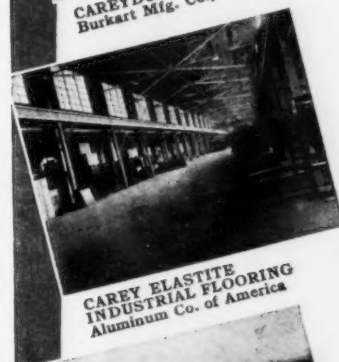
Carey
RESEARCH



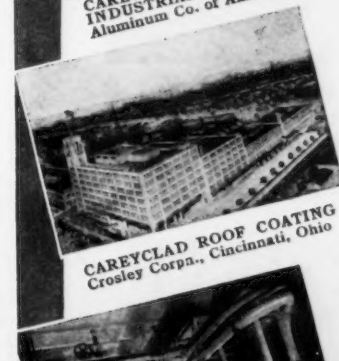
CAREYSTONE CORRUGATED ROOFING AND SIDING
Gulf Refining Co., Hooven, Ohio



CAREYDUCT (All Asbestos Duct)
Burkart Mfg. Co., St. Louis, Mo.



CAREY ELASTITE INDUSTRIAL FLOORING
Aluminum Co. of America



CAREYCLAD ROOF COATING
Crosley Corp., Cincinnati, Ohio



CAREY HEAT INSULATIONS
Industrial Rayon Corp., Painesville, Ohio

Numerous products developed by CAREY release resources needed for defense; this is important from a national viewpoint. Likewise, it has its advantages to industry, for experience has proved the superiority of CAREY materials in service and has demonstrated their ability to cut maintenance costs drastically.

Fireproof CAREYSTONE Roofing and Siding have definite advantages in permanence and low upkeep... CAREYDUCT, the all-asbestos prefabricated duct for air-conditioning systems, is superior to and costs about the same as insulated metal duct... CAREY ELASTITE Industrial Flooring provides a heavy-duty, long-wearing and resilient floor surface at relatively low cost... CAREYCLAD Roof Coating preserves the life of metal and Built-Up Roofs... CAREY HEAT INSULATIONS help conserve the nation's fuel supply.

Carey Rock Wool Insulation, Carey Built-Up Roofs, Careystone Wallboard, and other CAREY Products offer advantages in high efficiency and low upkeep.

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Budd Says Railroads Cannot Spare Men

Chicago.

• • • The railroads can help train men for defense but can not release any of their own men to other industries THE IRON AGE has learned from Ralph Budd, president of the Chicago, Burlington & Quincy Railroad, and transportation commissioner, Advisory

Commission to the Council of National Defense. (Sidney Hillman, labor coordinator of the OPM recently asked the railroads to transfer 100,000 maintenance men and skilled mechanics to the aircraft and shipbuilding industries).

Roads have about 300,000 skilled men at work now out of a total of 455,000 employed in maintenance of equipment on April 29, 1941. Burden of maintenance has never been so great as it is right now, railroad men contend. Much

rolling equipment which ordinarily would be scrapped is being repaired today because new cars cannot be obtained fast enough to meet defense program's overwhelming demands. Less cars are carrying more tons-per-mile than at any time in railroad history. Like others, hardly any apprentice training was conducted by the carriers during the depression; so every available mechanic is employed in railroad shops now, and the shops need many more than they can get.

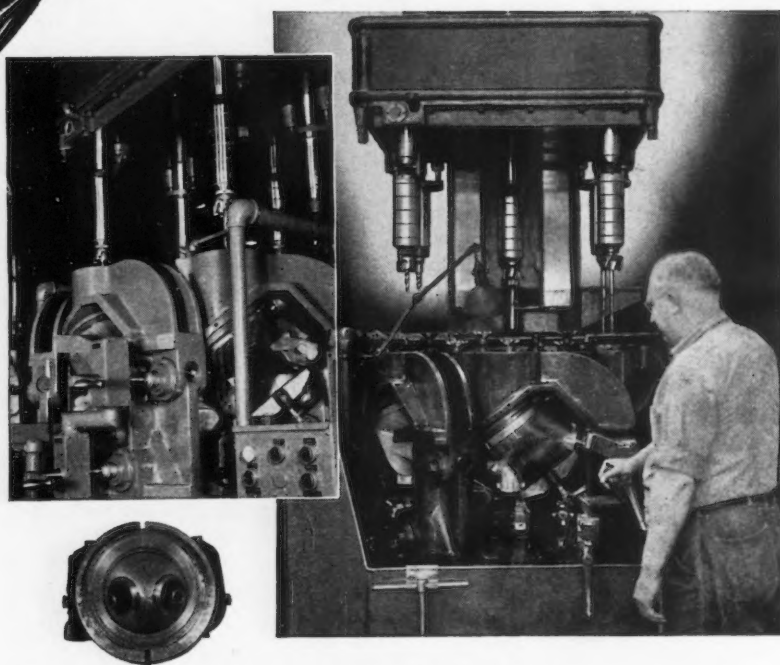
Executives also pointed out that railroad mechanics average more than 50 years of age and that these men would neither wish to be transferred to a brand new job nor would they be likely to quickly adapt themselves to new requirements.

From a letter written by Mr. Budd a week ago to J. J. Pelley, president of Association of American Railroads, Mr. Budd gave the THE IRON AGE permission to quote the following: "... we should review the situation to see what can be done to assist the Labor Division of the OPM in recruiting skilled mechanics. A sizeable number of machinists who have been retired on pension no doubt would be willing and able to work during the National emergency. ... The railways can also take hold of the problem to see how much service they could render in the way of training mechanics. ... However, great care must be used to avoid impairing the ability of the railways to give adequate defense service. ... It must be kept in mind that the greatest service which the railways can render to National Defense is in continuing to handle freight and passengers promptly."

One railway association official who asked that his name be withheld but who formerly was superintendent of a major shop stated that the railways were in a position to do a good job of training a number of young men equivalent to about 2 per cent of the total maintenance force employed.

The industry is now investigating its own skilled forces to see if there is a possibility of releasing any men at all to other industries, but it frankly doesn't feel that any will be unearthed. Its own defense job is huge and so important that it could actually use more men itself to keep the defense ball rolling.

Gairing in Aviation



MASS PRODUCTION

within tolerances of .0005 of an inch

In these machines, Gairing Carbide Tipped Tools perform a variety of operations on valve guide holes and valve seats in aluminum alloy Wright Cyclone aircraft engine cylinder heads.

They core-drill, counterbore, face, ream and chamfer on roughing, semi-finishing and finishing operations -- all within tolerances of .0005 of an inch.

Gairing engineers will gladly assist you with similar problems involved in programs of Peace or National Defense.

Use them!

The GAIRING TOOL CO., Detroit, Michigan
In Canada: Hi-Speed Tools Ltd., Galt, Ont.

SPECIALISTS IN FINE CUTTING
TOOLS FOR 24 YEARS

Lack of Steel Cuts Car Deliveries by 20,000, Budd Says

Chicago

••• Deliveries of new freight cars on order by Oct. 1, 1941, will be 20,000 short of the expected goal due to failure to get steel, according to Ralph Budd, transportation commissioner, Advisory Commissions to the Council of National Defense.

Mr. Budd also points out that the "carrying on of a vigorous repair program in order to make as many cars serviceable as possible is being interfered with in the same way by delayed deliveries of material. The mills claim that they have prior orders from various government sources which prevent their taking care of the railroad requirements."

On July 1, 1941, the United States had approximately 1,980,000 freight cars of which 1,700,000 were railroad-owned, of which total 87,400 were in bad order and unfit for immediate service. This compares with 2,277,505 cars in service in 1929.

SWOC Calls Meeting of "Little Steel" Leaders

••• The Steel Workers Organizing Committee has summoned 65 local union presidents from the plants of Republic Steel Corp., Inland Steel Co., Youngstown Sheet & Tube Co. and Bethlehem Steel Corp., to a two-day meeting to be held at the William Penn Hotel, Pittsburgh, on Aug. 14. The conference, according to David J. McDonald, SWOC secretary-treasurer, will deal with recent developments in the "Little Steel" group of the steel industry, representing the last important section of the industry not thus far under SWOC contract.

Defense Contract Service Opens Milwaukee Branch

••• Branch office of the Defense Contract Service was opened here on Aug. 4. H. H. Seaman, formerly president of Seaman Body Co., Milwaukee, is deputy coordinator and Clifford E. Ives, president of Ives Engineering Laboratories, Chicago, is deputy manager. Office is located in the Wisconsin National Bank Building.

Switzerland Still Ships Steel Files to U. S.

New York

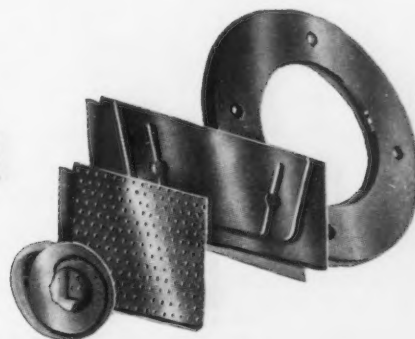
••• A large shipment of Grobet Swiss files was received on an American boat during July, according to the Grobet File Co. of America, New York. During the month of May, the Swiss chartered boat, *Jurko-Topic*, also brought in a large shipment of Swiss files.

NYA Purchases Arc Welders For 68 Training Centers

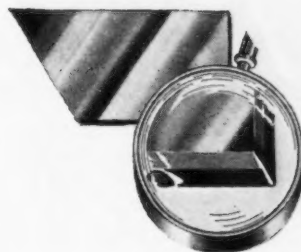
Cleveland

••• Sixty-eight branches of the National Youth Administration throughout the country are participating in a recent NYA purchase of 329 latest-type arc welding generator sets from the Lincoln Electric Co., of Cleveland, to provide instruction in defense classes.

Pre-Cast Bearing
Bronze on Steel
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New Bearing Metal Adapted to Many Other Uses



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Examine a section of *Pre-Cast Bearing BRONZE ON STEEL* closely and see how permanently the bronze is bonded to the steel.

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While *Pre-Cast Bearing BRONZE ON STEEL* was developed primarily for sleeve bushings and bearings, it also fills many other important industrial uses. It is ideal for applications requiring a flat bearing surface such as plates, washers, etc. In applications where the movement is slow or where lubrication is uncertain, it is often advisable to use the graphited bronze type.

Some manufacturers prefer to secure *Pre-Cast Bearing BRONZE ON STEEL* in rolls and do their own stamping and forming. In such cases, we can furnish it in coils up to 400 feet in length. The maximum width of the strip is 5½ inches.



JOHNSON BRONZE

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Investigate SPRING finishes

One feature of spring design always present is the question of finish. Springs may be made of Pre-finished materials or a finish applied after forming and heat treating.

The following pre-finished materials are available

Music Wire { Bright
Cadmium Plated
Tinned

Hand Drawn Spring Wire and Basic or Bessemer Wire { Bright
Tinned
Coppered
Galvanized
Cadmium Plated

Oil Tempered Wire Black
Stainless Steel Natural
Brass Natural
Phosphor Bronze Natural

For rust resistant finishes we suggest the following for round or flat materials

Enamel or Japan { Black
Red
Brown
Gray } These are the most commonly used

Lacquer { over Copper and Buffed
Buffed
Burnished
Dull
Black

Nickel { over Copper and Buffed
Buffed
Burnished
Dull
Black

Cadmium Bright
Galvanized Chrome Plated Dull
Brass Plated Black Oxidized
Copper Plated Statuary Bronze

Bring your questions about finishes to Dunbar for advice and consultation.

Dunbar Bros. Co.

DIVISION OF ASSOCIATED SPRING CORPORATION

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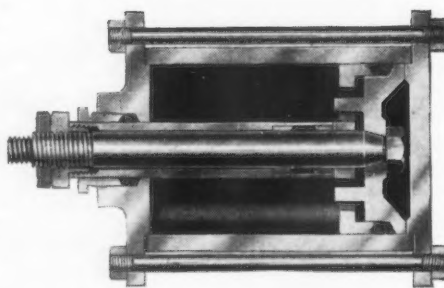
3 FEATURES for better use of air power

Hannifin Pneumatic Cylinders, all sizes and lengths, are bored and then honed. The cylinder interior is straight, round, perfectly smooth.

Simple outside adjustment of piston packing, without disturbing any other parts, allows easy maintenance of high efficiency piston seal.

The soft-graphite treated piston packing can be renewed, if necessary, by applying ordinary graphited packing, always available. No special parts are needed.

Hannifin design prevents leakage and waste of air power, keeps friction loss at a minimum. For sustained high efficiency, use Hannifin cylinders. Write for Bulletin 34-A.



HANNIFIN MANUFACTURING COMPANY
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HANNIFIN "Leak-Proof" AIR CYLINDERS

Canada's Pig Iron Output at New High

Toronto

• • • For the month of June pig iron production in Canada totaled 112,313 gross tons or an all time peak daily average of 3744 tons, compared with 113,624 tons in May when the daily average was 3665 tons, and with 88,656 tons in June, 1940, when the daily rate averaged 2955 tons. June's total included 97,190 tons of basic iron of which 96,491 tons were for further use of producing firms and 699 tons for sale; 10,107 tons of malleable iron and 5016 tons of foundry iron, all the latter two grades being for sale.

In the first six months of this year pig iron output topped all previous half-year periods, with total of 625,551 gross tons, which compares with 621,264 tons in the six months immediately preceding and 549,627 tons for the first half of 1940. For the corresponding period of 1939 pig iron production totaled 296,521 gross tons. For the first half of the current year pig iron output included 521,104 tons of basic iron for further use of producers and 5451 tons for sale; 47,883 tons of foundry iron, all for sale; 50,466 tons of malleable iron for sale and 647 tons for further use of producing companies. In the making of pig iron for the half-year 1,104,986 gross tons of iron ore were used of which about 65 per cent came from the United States, the balance from the Wabana, Newfoundland mines of Dominion Steel & Coal Corp., delivered to Sydney, N. S., and from the New Helen Mine of Algoma Steel Corp., Ltd., delivered to Sault Ste. Marie, Ont. At the end of June nine out of a total of 10 blast furnaces were blowing.

Production of ferro-alloys in June amounted to 14,699 gross tons against 15,117 tons in May and 10,128 tons in June, 1940. Production of steel ingots and direct steel castings in the month of June fell to 187,163 gross tons from the high record made in May of 206,110 tons and compares with 166,213 tons for June, 1940. The total for the month under review included 178,575 tons of steel ingots and 8588 tons of direct steel castings.

New Type Valve To Aid Defense Program

Cleveland

••• A new type valve which holds big possibilities for the defense program, and later for peace-time channels, has been developed. With one motion it is possible to shut off a valve and disconnect it simultaneously. The time required for removal of aircraft motors from planes has been lowered sharply through adoption of this new device.

More Kingsbury Shell Loading Agreements Made

La Porte, Ind.

••• Supplemental agreements amounting to over \$3,000,000 have boosted the cost to more than \$15,000,000 of the Kingsbury shell loading factory under construction near here. War department made the agreements in addition to fixed-fee contracts with Bates & Rogers Construction Co., Chicago, for construction; with Giffles & Valet, Detroit and Charles W. Cole, South Bend, for architectural and engineering work.

CIO Defeats AFL In Vote At Harvester's McCormick Plant

Chicago

••• CIO won out over the AFL in a run-off election at the McCormick works of the International Harvester Co., here. Vote margin given the CIO was only 243 out of almost 6000 ballots cast. The first election at this plant held over a month ago was so close that it was contested.

Navy Buys 25,000 Regulators

Cleveland

••• Harris Calorific Co., Cleveland, largest independent manufacturer of Oxy-Acetylene apparatus in the United States, has been awarded an order for 25,500 regulators for the U. S. Navy. Mr. Lorn Campbell, Jr., president of the company, said that to his knowledge this is the largest single order for gas welding apparatus ever to be delivered to an American consumer.

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INDUSTRIAL and

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INDUSTRIAL PERFORATIONS include round, square and special shaped perforations as used in mechanical arts. Our line is comprehensive.

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WEAR-
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High Temperature!

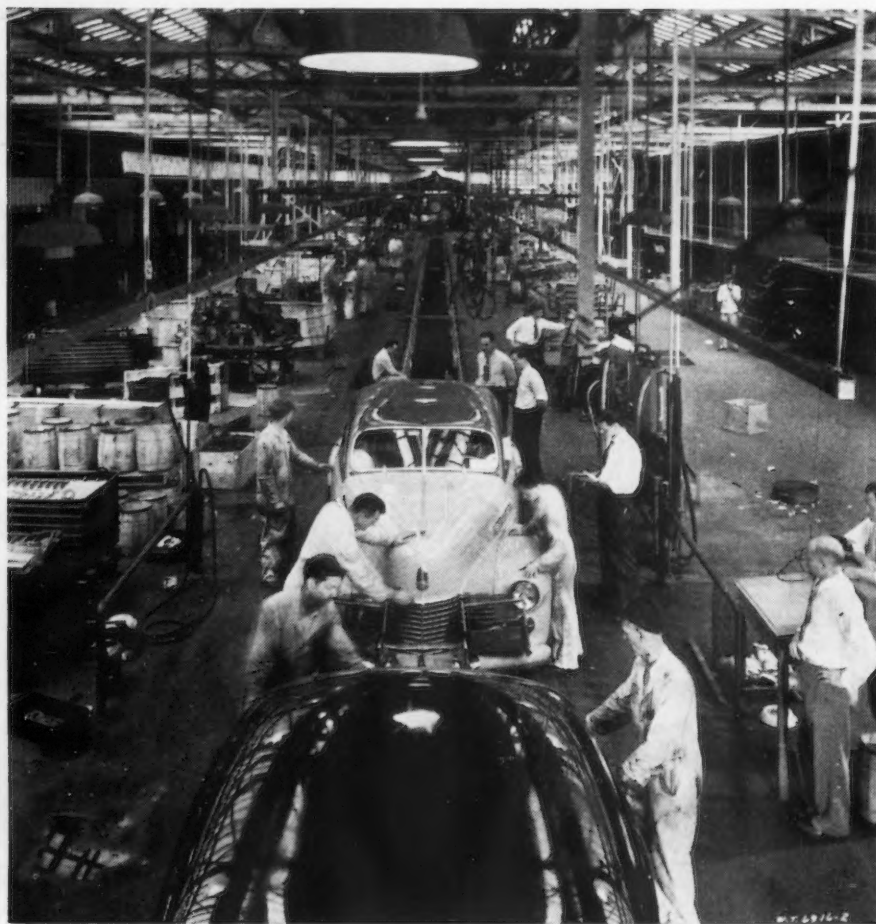
Here is a pair of open hearth charging machine rams. They must stick their face into hot places, and must resist the abrasion that comes from open hearth charging.

They certainly need a hard face to stand up to this type of work, and they've got it! Their face is of the hardest—it's Coast Metal!

This is a typical example of the use of Coast Metals for resisting abrasion and impact at high temperature.

COAST METALS, Inc.

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CANTON, OHIO



END OF "RUN": Above scene was typical of the automobile industry last week as many factories wound up their 1941 automobile runs. This picture was taken at the Cadillac plant and shows the last two cars off the assembly line. A few minutes before, the line teemed with activity. Now stocks are depleted and many of the workmen have gone home. They will be called for resumption of production in two or three weeks.

On the Assembly Line

[CONTINUED FROM PAGE 66]

It is considered likely that this fall will see an accentuation of troubles experienced this spring and summer, when shortages of materials caused many delays in production.

It may interest some suppliers to know that not all the parts production requirement for 1942 models have been placed. A "run" of about 600,000 small stampings for a door handle, to replace a die casting, was available at last reports last week, along with a similar number of small screw machine parts. One agent reported having canvassed local stamping plants without finding an agent.

Hudson has started production and is delivering cars to distributors, although they are not yet

formally announced. Informally, they were shown to a small group here last week. Three new lines were shown, but three body types—the eight-passenger eight-cylinder sedan, station wagon and panel delivery—have been discontinued. The cars are similar to 1941 models, but have concealed running boards. Only mechanical change is the introduction of a special driving mechanism that includes a mechanical adaptation of the Hudson oil clutch, giving results similar to a fluid coupling. There is much "bright metal" trim on the cars—much more than last year. It extends all around the body, splashes on the sides of fenders, etc. "Bright metal" is the only term used to explain it, although it appears to be a chrome plate, possibly minus the nickel used under chrome flash.

Surprisingly, also, it is learned

that some other cars will make their initial appearance with lots of bright shine on the exterior. One will boast a bumper "bigger and brighter" than ever, and that's fairly typical. How long the bright trim will remain with us is another matter. Probably when the first glances have been received by each new model, the bright trim will disappear, band by band. Mousiness of appearance then will be relieved by other contrivances, such as bright colored lacquers and plastics, where adaptable.

Automobile production last week was 62,146, compared with 105,635 in the previous week and 107,373 in the corresponding week of last year, according to Ward's Reports, Inc.

Buick's \$41,000,000 Aircraft Engine Plant Near Completion

Chicago

• • • Night and day crews of 1500 working on the Buick aircraft engine plant under construction here may finish the plant by Sept. 1, which would be 15 days ahead of schedule. Machinery for the \$41,000,000 project is being assembled while the plant is going up. There will be about 1500 machine tools in the factory here and about 750 in Flint, Mich., where parts of the 1200 hp. Pratt & Whitney engines will be built and shipped here for testing and assembly. Buick now holds \$129,000,000 in engine contracts and its original production quota of 500 units per month has been increased to 1000 with the possibility that another 500 monthly will be added.

New Type Tanks Being Shipped to Britain

Hammond, Ind.

• • • Two 28½-ton tanks—first of that size on order in the U. S. for England—have been started on their way East for shipment to Britain by the Pullman-Standard Car Mfg. Co. Tanks will be equipped with armament—a 75 mm. gun, a 37 mm. gun and 0.30 and 0.50 cal. machine guns—on the East coast. Contract was awarded to Pullman-Standard in September, 1940, and officials say production has been attained on that order at the Hammond plant.

Packard Opens Its Rolls-Royce Plant

Detroit

••• After only 10 months of preparation for production of the Rolls Royce Merlin airplane engine, Packard Motor Car Co., Saturday afternoon opened its plant to approximately 600 guests for dedication of the first two Packard-built Rolls Royce engines. The ceremonies were the official marking of the start of production on the original order for 6000 of the Rolls Royce for Britain and 3000 for the U. S. Army air corps.

It was revealed that the U. S. Army air corps will make use of these engines in an advanced version of the Curtis P-40 airplane, the revelation coming from Major-General George H. Brett, chief of the U. S. Army air corps.

Visitors to the \$30,000,000 aircraft plant occupying more than 1,000,000 sq. ft. of floor space included William S. Knudsen, director general of OPM, General Brett, Sir Henry Self, head of the British Air Commission, and representatives of other major industries, including automobile companies

and the suppliers of machine tools and other materials and equipment which went into the new plant.

The ceremony centered around an international broadcast after the plant tour.

Packard's president, M. M. Gilman, paid tribute to the "willingness of friends in industry to aid us in our task." He named specifically the Ford Motor Co., Pratt & Whitney, Curtiss-Wright, and Allison division of General Motors Corp. He also named the important suppliers including Bendix Corp., Aluminum Co. of America, Bethlehem Steel Co., Chicago Pneumatic Tool Co. and Republic Steel Co.

It was revealed by Mr. Knudsen that 2300 of the 3000 machine tools required for the plant are already installed. This is enough to permit production of all parts necessary to start assembly. The remaining machines will be required to bring the plant up to its peak output of about 40 engines a day early next year. He also revealed that 350 sub-contractors were participating in supplying parts. Forty-five hundred men are now working in the plant, it was

stated, and Knudsen declared that about 500 per week would be added to reach a peak employment of 14,000.

OPACS Given Plan Limiting Auto Output to Light Cars

Washington

••• A proposal to confine automobile production to light, low-cost cars, thereby using 30 per cent less defense materials, was submitted to OPACS last week by Joseph W. Frazer, president of Willys-Overland Motors. Mr. Frazer estimated that on the basis of 1941 production figures the program would save upwards of 2,500,000 tons of defense materials needed for armament purposes.

The proposal was offered to OPACS as a method of avoiding an automobile shortage. A possible 1,750,000 lb. of steel alone could be saved and diverted to the manufacture of 46,000,000 shells, and a saving of 160,000,000 lb. of rubber, enough for 17 new dreadnaughts of 35,000 tons each, plus 180,000 medium sized tanks, were offered as potentialities under the proposal.

PACKARD ROLLS-ROYCE: This is one of the many machine shops busily turning out cylinder liners for Packard Rolls-Royce airplane engines. The new plant opened last week.



Mystery Strike Halts Arvida Aluminum Output

Ottawa

••• When 300 men suddenly seized control of the pot room, most vital point in the \$150,000,000 Arvida, Que., plant of Aluminum Co. of Canada, Ltd., on Thursday, July 24, and held control until they voluntarily left the property the following Sunday, they brought operations at the gigantic plant to a standstill and made it impossible for the company to regain normal production for about three weeks, Hon. C. D. Howe, Minister of Munitions and Supply, told a press conference. Mr. Howe was on the scene from the beginning, but the public was not informed of the strike until a week later. The shut down affected 9000 workmen, 5000 of whom were employees in the plant, and 4000 workmen engaged by Foundation Co. of Canada, Ltd., working on a plant addition. The metal which "froze" in the pots will have to be chipped out before production can be resumed.

Two companies of troops were moved to the plant as a "precautionary measure," Mr. Howe said, but there was considerable delay in making necessary arrangements. To avoid a recurrence of such delays Cabinet Council has

passed an amendment to the Defense of Canada Regulations providing the Munitions Minister with authority to instruct immediate intervention by police or military forces without first approaching provincial authorities.

Mr. Howe said, "This was not a labor dispute. The officers of the labor union (the National Catholic Syndicate of Aluminum Workers, which the Minister said had a membership of about 1000 of the plant's 5000 employees) knew nothing about it. When work was resumed no concessions were granted." He said the shutdown was "a suspected case of enemy sabotage and that arrests definitely will be made, if none has been made already."

A later statement from official quarters in Ottawa, however, states that no evidence has been uncovered that planned sabotage caused the disturbance. Investigators said there is no indication that enemy agents or sympathizers were involved. Prosecutions of strike leaders are expected soon, it was said, but it is intimated that the charges will be for participating in an illegal strike and not the more serious one of deliberately planning damage to the plant. Negotiations are reported to be under way between the employees and representatives of the company.

"Fortunately," Mr. Howe said, "reserves of aluminum in Canada and Great Britain, it is expected, will be sufficient to avoid interruption in airplane production here and overseas." So far, about 85 per cent of the aluminum from the Arvida plant has gone to Great Britain and the remainder to Canadian industry. The company has orders for supplying United States plants but will not begin filling them until the new additions are completed.

Henderson—"Man Who Wants to Rule Steel Through Taxes"

Washington

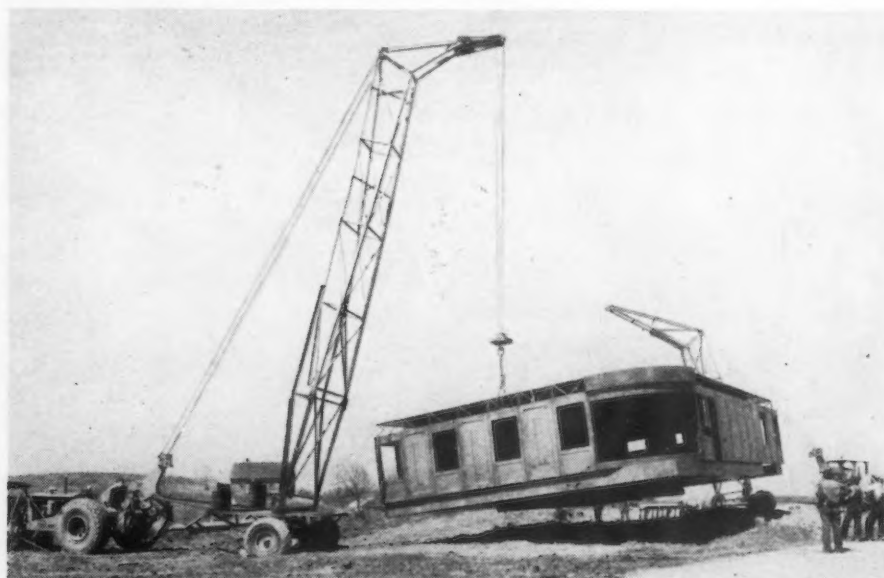
••• Leon Henderson, close White House economic adviser and chief of the Office of Price Administration and Civilian Supply, was described in Congress last week as "the man who wants to control distribution of steel through taxation."

Representative Thomas A. Jenkins, Republican, of Ohio, charged that the Henderson philosophy of taxation, embodied in the proposal to curtail the consumption of steel by levying a 20 per cent tax, was an attempt by Mr. Henderson to tax the automobile "off the roads."

The House Ways and Means Committee turned down the Henderson proposal with respect to automobiles when it reported the new revenue bill but, according to Mr. Jenkins, accepted the theory in dealing with a number of other commodities. For example, the measure seeks to levy a tax on business and store machines and in this connection enumerates about 50 items, including adding machines, check-writing machines, typewriters, and similar products made from steel.

"I say that is a fallacious philosophy of taxation and is a matter that should be controlled by priorities absolutely, and not by taxation," Mr. Jenkins said. "Those of you who are tax experts want to be on the lookout for this new theory. It is insidious and it is something that if extended might work disaster. This is a fantastic idea, primarily of one man who wants to control distribution of steel through taxation."

PREFABRICATED RADIO STATION: This building for radio station WRLC of R. G. Le Tourneau, Inc., at Toccoa, Ga., was entirely prefabricated by arc welding at the Le Tourneau plant and hauled by truck trailer to the site. Welding equipment was supplied by Lincoln Electric Co., Cleveland.



Ground is Broken for Allegheny Ludlum Plant

••• Ground was broken this week for the Allegheny Ludlum Steel Corp.'s new Brigham Road "Defense Plant" at Dunkirk, N. Y. When completed, the plant will produce alloy steel bars and rods of a special nature urgently needed for defense production.

Because of a recent increase in the planned capacity and a revision in types of equipment, the plant will cost approximately \$4,000,000 instead of the \$2,500,000 originally estimated last spring. The plant is being financed by the Defense Plant Corp.

Awards of major contracts for construction, materials and equipment for the Brigham Road plant were also announced. The building, a brick and steel structure enlarged now to 875 x 215 ft. will be constructed by the Gillmore-Carmichael-Olsen Co., Cleveland.

Two thousand tons of steel for construction will be furnished by the Ingalls Iron Works, Verona, Pa. Delivery is scheduled to be made in 18 to 23 weeks and the building is expected to be completed two months later.

Contracts for rolling mill equipment, comprising 18 stands of rolls with necessary heating and annealing furnaces, have been let to the United Engineering & Foundry Co., Pittsburgh. Cincinnati Grinders, Inc., will furnish 20 centerless grinders.

Tuff-Hard, Detroit Firm, Plans Defense Expansion

Detroit

••• An expansion plan to keep pace with defense work demand has been announced by the Tuff-Hard Corp., through the president and general manager, Fred A. Endress. The program includes doubling of capital and surplus funds. The Tuff-Hard process for heat-treating cutting tools is said to step up production rates from 50 to 600 per cent in tool shops and general manufacturing plants. Details of the process have been closely guarded because of potential military value.

In addition to Endress, the inventor, who retains his title, the company now has the following



Photo by Wide World

TAPS FOR STOVEPIPES: U. S. arms plants, working at record speed to catch production in the totalitarian countries, made possible this photo of a "funeral" held by the 175th Infantry at Fort Meade, Md., for stove pipes which had been used in training as mortars. The 175th has received real trench mortars.

board members: C. Edward Price, vice-president of Peninsular Grinding Wheel Corp.; W. A. P. John, president of MacManus, John & Adams, Inc.; W. R. Tracy, former vice-president in charge of sales for Hudson Motor Car Co., and John Z. Lander, vice-president of Peninsular State Co.

Work Begins in August On G-E's New \$20 Million Plant

Fort Wayne, Ind.

••• General Electric's new \$20,000,000 plant for manufacture of turbo-superchargers for aircraft engines will be under construction within a month. Charles E. Wilson, president, inspected the site recently. The new building will be 800 ft. x 500 ft.

Giddings & Lewis June Shipments Set Record

Fond du Lac, Wis.

••• June shipments for Giddings & Lewis Machine Tool Co. were the largest in the firm's history, according to H. B. Kraut, president, who stated also that the backlog of orders indicates capacity production through 1942. It is expected capacity will be reached this fall.

Coast Sees Large Scale Power Plant Expansion

San Francisco

••• Large scale power plant construction and expansion on the West Coast is reflected in bid openings by the Bureau of Reclamation and other agencies. Westinghouse Electric & Manufacturing Co. was low bidder for one generator for the Parker Power Plant, Earp, Cal., with a bid of \$367,700. General Electric Co. submitted the low figure of \$425,390 for a steam turbo-electric generator for the Glendale, Cal., steam plant.

The Bureau of Reclamation awarded a 30,000 kv. hydraulic turbine and governor for Parker Power Plant to S. Morgan Smith Co., York, Pa. Low bidder to the bureau for three 150,000 hp., 120 rpm. vertical shaft hydraulic turbines for Grand Coulee Power Plant was Newport News Shipbuilding & Dry Dock Co., Newport News, Va., with an offer of \$1,880,000. Bids will be taken by the bureau Aug. 19 for three 34,600 hp., 94.7 rpm. vertical shaft hydraulic turbines and governors for Keswick Power Plant, Central Valley Project, Cal. The bureau will take bids Aug. 18 for one 103,000 hp., 138.5 rpm. vertical shaft hydraulic turbine and governor for the Shasta Power Plant, Cal.

Priority Control Set On Pig Iron Supplies

Washington

••• A forerunner to similar action that had already been predicted for steel, the OPM's order placing merchant and steelworks pig iron under full priority had been anticipated for almost a month, as reported in THE IRON AGE of July 10, page 17. The ruling became effective Aug. 1, the day it was announced.

Signed by Priority Director Edward R. Stettinius, Jr., the pig iron order places the blast furnace product under complete government control in an effort to meet an acute shortage. It provides for setting up monthly quotas, beginning with September, in an emergency pool and requires OPM approval before any shipments can be made to consumers.

This action, Mr. Stettinius said, was taken to "make sure that pig iron goes to iron foundries and steel plants and other consumers in quantities necessary to fulfill defense requirements." The order followed a study by the OPM bureau of research and statistics, which indicated a pig iron shortage for 1941 ranging above 5,000,000 net tons.

The order requires that users of pig iron and scrap maintain substantially the same ratio of these steelmaking raw materials as has been their former practice. Likewise, warning was given that "any radical departure from past production practices in this respect, which cannot be justified, may be subject to further action by the Director of Priorities." Apparently offered as a yardstick for the mix used in making steel, the announcement said that at present the mix is about 56 per cent pig iron and 44 per cent scrap.

Terms of the pig iron order (M-17 to "Conserve the Supply and Direct the Distribution of Pig Iron") carry seven main points, as follows:

(1) All defense orders, (Army, Navy, British, etc.) carry a preference rating of A-10 unless higher ratings are specifically assigned.

(2) Defense orders must be accepted in preference to and given priority over non-defense orders.

THIS WEEK'S

Priorities and Prices

(OPM)—Priority control for **pig iron** established Aug. 1.

(OPM)—**Mining machinery** and equipment receives an A-3 limited blanket rating, applicable to 40 manufacturers and to sub-contractors.

(OPM)—Limited quantities of aluminum will be provided for manufacture and maintenance of **radio sets** for civilian use.

(OPM)—Seventy-five makers of **cranes and hoists** given new blanket preference ratings to replace old order expiring July 31. Sub-contractors are also covered.

(OPM)—Emergency **zinc pool** of 27 per cent of June production, or 19,000 tons, to be set aside by zinc producers in August.

(OPM)—One hundred **cutting tool** manufacturers given an A-1-A blanket preference rating to assure that they will be able to obtain material required to make the tools.

(OPM)—Full priority control established for **copper** effective Aug. 2. No copper can be shipped now without specific direction of OPM.

(3) During each month, beginning with September, each producer of pig iron must set aside a quantity to be specified by the Director of Priorities. The total amount thus set aside will form an emergency pool, out of which allocations may be made for the following month to meet emergency needs.

(4) Beginning on Aug. 1, any customer ordering pig iron must do so on a special form in accordance with instructions from OPM.

(5) Each producer of pig iron is required to submit before the 15th of each month a proposed shipment schedule of pig iron for the following month, not including the pig iron withheld for allocation. Beginning Sept. 1, no shipments may be made to any person unless these shipments have been approved on the schedule or unless special provisions have been made by OPM.

(6) In regulating the distribution of pig iron for non-defense purposes, the Director of Priorities will be guided by any civilian allocation program promulgated by the Office of Price Administration and Civilian Supply.

(7) The order contains provisions designed to prevent the building of excess inventory.

At the beginning of the year, according to the OPM's bureau of research and statistics, pig iron stocks in hand were estimated at 3,100,000 net tons, and pig iron production for this year was estimated at about 54,000,000 tons, a total of 57,100,000 tons. A shortage of 5,000,000 tons, the bureau said, is expected this year. Based on a

steel furnace charge of 56 per cent pig and 44 per cent scrap, the demand for pig iron will approximate the following, the OPM said: military, 9,000,000 tons; British and export, 12,300,000 tons; civilian and indirect defense, 40,700,000; total, 62,000,000 tons.

In a letter to pig iron makers and users, Mr. Stettinius said that the position of all producers' monthly output will be held to a minimum compatible with defense needs.

"In practically every instance," said Mr. Stettinius, "it will be very much less than the amount of pig iron which those producers known as integrated steel companies have regularly sold in the open market. It is not to be inferred by the producers that the percentage of pig iron so withheld is to represent the total amount of pig iron which they will offer for sale on the open market.

"It is intended that all integrated companies will continue to carry their regular merchant load as in past years and thereby eliminate the necessity of directing the pig iron withheld away from any of these producers."

Job Insurance Payments Refused Seneca Wire Strikers

Columbus, Ohio

••• Employees of Seneca Wire & Mfg. Co., Fostoria, Ohio, affected by the work stoppage which began May 26, have been refused state unemployment insurance under a ruling last week because the stoppage has been deemed a strike.

C-I Signs Pig Iron Expansion Contract

Washington

••• Without revealing details, the Defense Plant Corp. has announced that it had made a contract with the Carnegie-Illinois Steel Corp., for "the construction of plant facilities and equipment for the production of pig iron." This is part of the OPM-recommended program to increase pig iron capacity. The new plant will be located at Braddock, Pa., and will form a part of the Edgar Thomson facilities. It is known that the contract, involving \$32,000,000, includes the construction of a blast furnace, which, as pointed out in THE IRON AGE of July 31, page 69, was allocated to the Edgar Thomson plant by the OPM in connection with its 6,508,950-ton blast furnace capacity expansion program.

Meanwhile it is said that there may be a readjustment of the steel expansion program. It is reported that the plan to build open hearth and finishing mill capacity at the Provo, Utah, plant of the Columbia Steel Co., may be abandoned and the expansion added to one of Columbia's plants on the Pacific Coast. It has plants at Torrence, and Pittsburg, Cal.

At the same time other interests have approached OPM officials seeking to get government financing for an entirely new plant on the Pacific Coast.

The plan to have Columbia Steel add three blast furnaces to the one it now has at Provo remains unchanged.

New OPM Rating Issued on Crane, Hoist Materials

Washington

••• Expanding the list of materials to which the former blanket preference rating on cranes and hoists applied, OPM's Priorities Division last week issued a new preference rating to 75 manufacturers, and explained that suppliers and sub-suppliers may now apply the rating to deliveries from their own sub-contractors.

The new order, identified as P-5-a, supersedes the previous order, P-5, which expired July 31. It permits the 75 producers to apply a rating of A-1-a to deliveries of these materials:

Motors and other electrical equipment; alloy and carbon steels in bars, forgings, castings, plates, shapes and tubes; ferrous and non-ferrous castings; machine parts and equipment; cutting

Navy Honor Roll

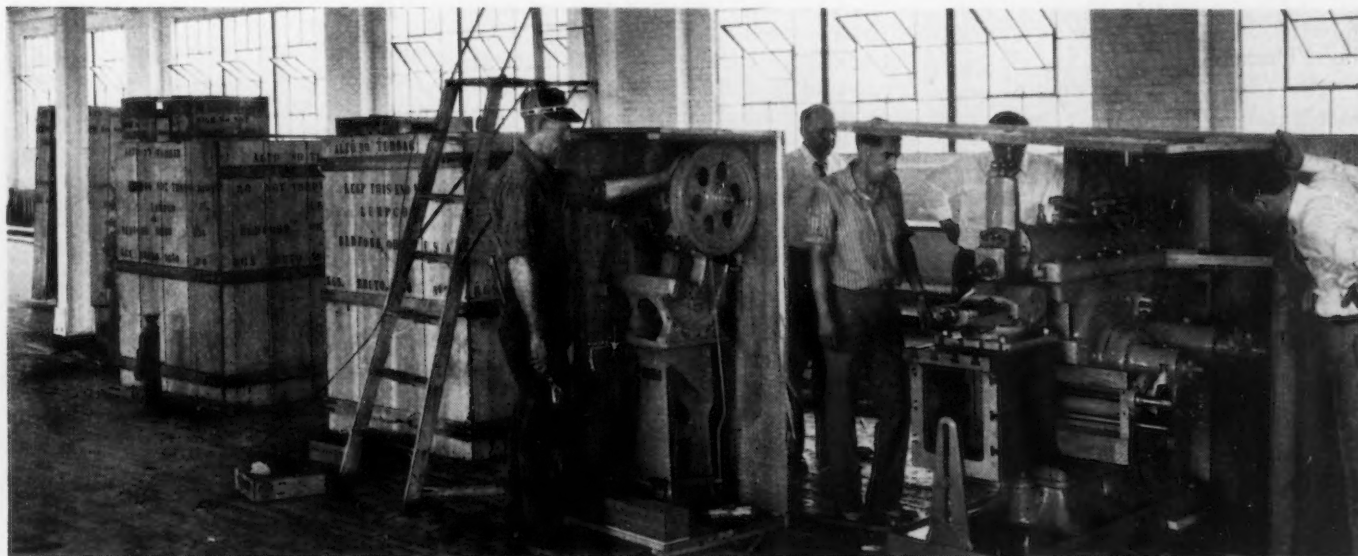
Worthington Pump & Machinery Co., Harrison, N. J., this week was formally commended by the Navy department "for expeditious delivery of pumps and other auxiliary machinery needed for conversion of merchant vessels taken over by the Navy."

tools, including cemented carbides; abrasives; measuring instruments and gages; brass, copper, and steel tubing, and fittings; oil resisting hose; hydraulic bridge brakes; gasoline and diesel engines and accessories; maintenance and shop supplies necessary for proper operation and maintenance.

Also included are foundry supplies consisting of steel, rail and other steel scrap; silvery pig iron; regular pig iron; coke; ferro-silicon; ferro-manganese; vanadium; nickel, molybdenum and chromium.

Defense products in the manufacture of which the blanket rating may be used include cranes and hoisting equipment of several specified types.

TOOLS FROM BRAZIL: Part of the first shipment of South American machine tools received July 22 by Lempeco Products, Inc., Bedford, Cleveland, is shown here being inspected. These two pieces are a shaper and a small punch press. Lempeco has become exclusive distributor in the United States, the British Empire, Mexico and Cuba for machine tool producing companies in Buenos Aires, Argentina, and Sao Paulo, Brazil. (The Iron Age, July 24, page 93). The firm is an automotive parts manufacturer. Additional shipments are expected later. Up until now South America was not looked upon as a possible source of machine tools. In fact, shipments of American made machine tools to Latin America have been growing substantially since the start of the war. In peace time, German and British machine tools have dominated the market there.



Higher Taxes Cut

Steel Earnings 22%

• • • Higher taxes, wages and raw material costs in the second quarter combined to force a 22 per cent reduction in earnings of the steel industry from the first quarter level, despite the higher rate of operations prevailing in the second three months, according to a compilation by THE IRON AGE embracing 17 companies having over 85 per cent of the nation's steel ingot making capacity.

While the exact nature of taxes to be applied against earnings has not yet been decided by Congress, the general practice has been to establish reserves on the basis of the tax bills now being discussed in the House of Representatives. While most of the major steel companies reporting earnings thus far have shown declines in second quarter earnings, but a number of smaller companies did show gains in second quarter earnings, as Youngstown Steel, Wheeling, Keystone, Wickwire-Spencer and Continental Steel. Profits of Rustless Iron & Steel were almost identical in both quarters.



Heavy Taxes Cause Drop In Bethlehem Steel Profit

• • • Despite the fact that backlogs, shipments and production, of Bethlehem Steel Corp. established new highs in the second quarter, net earnings, after all deductions, declined sharply to \$5,651,457 from \$10,436,028 in the first three months, Eugene G. Grace reported last Thursday.

The second quarter decline was attributed to the sharply increased rate of taxation. Profit in the second quarter of 1940 was \$10,807,318. Earnings for the first six months of the present year are \$16,087,485, or \$4.29 a common share, as compared with \$21,698,457, or \$6.09 a share in the comparable period of 1940.

Second quarter profit was equal to \$1.34 a common share, after preferred requirements, as compared with earnings of \$2.95 in the preceding period and \$3.07 in the second quarter of 1940.

The directors declared the regu-

Steel Industry Earnings Drop 22%

	2nd Quarter, 1941	1st Quarter, 1941	2nd Quarter, 1940
U. S. Steel Corp.	\$24,814,751	\$36,559,995	\$19,201,008
Bethlehem Steel Corp.	5,651,477	10,436,028	10,807,318
Republic Steel Corp.	5,428,748	8,189,966	3,337,730
National Steel Corp.	5,291,430	5,430,389	3,004,624
Youngstown Sheet & Tube Co.	4,765,996	4,576,197	998,756
Inland Steel Co.	4,102,572	4,555,118	2,873,655
Jones & Laughlin Steel Corp.	3,937,720	4,160,507	2,141,645
American Rolling Mill Co.	3,068,735	3,599,241	1,079,405
Wheeling Steel Corp.	2,708,187	1,981,009	1,019,426
Allegheny Ludlum Steel Corp.	1,449,183	2,720,164	1,008,121
Rustless Iron & Steel Corp.	582,762	581,698	332,754
Keystone Steel & Wire Co.	538,863	410,137	.....
Otis Steel Co.	494,072	594,183	*196,629
Wickwire-Spencer Steel Co.	460,255	231,172	*177,470
Continental Steel Corp.	324,435	313,122	141,339
Sharon Steel Corp.	285,988	527,253	79,327
Alan Wood Steel Co.	283,266	473,794	224,313
Granite City Steel Co.	24,828	93,195	7,238
Crucible Steel Co. of America	**2,488,738	**435,692	1,211,727
Total	\$66,702,006	\$85,868,860	\$47,094,287

*Loss.

**Company's quarterly statements have been adjusted for the sake of comparison to account for tax reserves reported in official six month's total but not the quarterly statements. Reserves for taxes reported for the half year were prorated equally over the two quarters.

lar quarterly dividend of \$1.75 a share on preferred stock and \$1.50 on common.

Bethlehem's tax, including federal income and excess profits, estimated on the basis of the schedule recommended by the Ways and Means Committee of the House of Representatives, amounted to \$35,435,000, or close to 69 per cent of earnings for that period.

Discussing the earnings, Mr. Grace said that the company is making no profit on some steel products and is scraping bottom on others.

Steel production of the company averaged 102.6 per cent of capacity in the second quarter, against 100.3 per cent in the previous period and 82.6 per cent in the second quarter of 1940. The current rate of production is about 101 per cent, Mr. Grace said, with bookings continuing to exceed production. The company has exceeded theoretical capacity for 12 consecutive months. Second-quarter production and billings were at new peaks.

Employment in the June quarter was 156,801, a new high, comparing with 141,321 in the March quarter and 112,316 in the second quarter of last year. Payrolls set a new high of \$84,629,000, against \$68,406,000 in the previous quarter and \$48,457,000 in the 1940 period. Average earnings an hour were 105.2 cents, against 97.3 cents three months before and 93.1 cents the year before, and the average

work week was 39.2 hours, against 37.9 and 35, respectively.

The estimated value of orders on hand on June 30 was \$1,367,500,000, a new high record, against \$1,323,200,000 three months before and \$288,521,487 the year before, and the amount of steel represented in bookings corresponded to five to six months' production at current rates of output.

Metal Lath Simplified To Cut Inventories 30%

• • • A simplification program, aimed at reducing by 30 per cent inventories of metal lath carried by mills and jobbers, by cutting down the number of items manufactured, has been approved by the industry's standing committee and the simplified practice division of the Bureau of Standards.

The revision would eliminate 2.2 and 3 lb. per square yard flat expanded, and 4 lb. per square yard flat rib expanded metal laths; 12, 14 and 18 ft. cold rolled channels and 6, 7, 9 and 11 ft. small nose galvanized corner beads. The first simplification program of the industry was in 1924.

\$15 Million Tank Orders Go To American Car & Foundry

• • • Charles J. Hardy, president of American Car & Foundry Co., announces receipt of orders from the government for 629 twelve-ton tanks and parts, aggregating over \$15,000,000.

June Steel Wages Up to 99.2c. Average

••• Employment in the steel industry rose during June for the fifteenth consecutive month, and established a new peak of 638,000 wage-earning and salaried employees.

Steel employment in June was 6000 greater than the May figure of 632,000 employees, and compared with 535,000 steel employees in June, 1940. In April of last year, when the employment began to rise, 503,000 men were on steel company payrolls, according to the American Iron and Steel Institute.

Total payrolls during June were \$110,504,000, or slightly below May payrolls of \$115,267,000 because of the shorter month. In June a year ago, steel payrolls amounted to \$77,388,000.

Wage-earning employees of the industry earned an average of 99.2c. per hour in June, as against 98.1c. per hour in May and 85.9c. per hour in June, 1940.

An average of 38.2 hr. was worked per week by wage earners in June, compared with 39.7 hr. per week in May and 35.9 hr. per week in June of last year.

OPM Amplifies Regulations Covering Inventory Levels

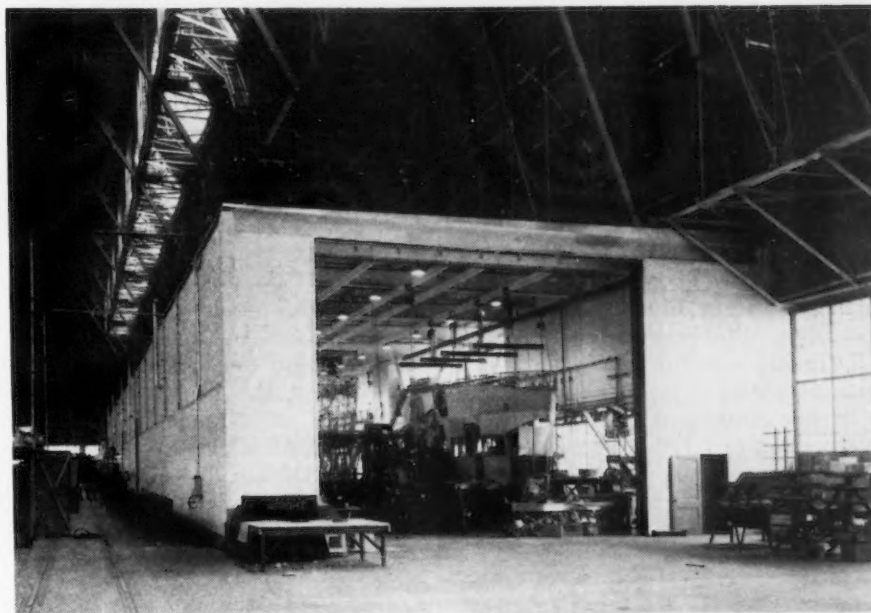
Washington

••• In an effort to hold inventories to a minimum and speed production, the OPM priorities division expects manufacturers, while waiting for deliveries of materials under preference ratings, to bite into their inventories in starting production and later replenish them with preference rated materials as they arrive.

Amplifying regulations covering inventory levels, the priorities division cited this typical case in illustrating the announced policy:

"Suppose manufacturer X has a defense contract on which early completion is desired. Suppose he has placed orders for material with his supplier, and has had a preference rating assigned to his order.

"Since a preference rating applies usually to a specific order, some manufacturers have felt that they must wait until the ordered material had actually arrived before



INSIDE THE WHITE BUILDING above, which itself is inside the confines of the world's largest airship dock (Goodyear) at Akron, Ohio, is a control car under construction for the Navy. The car will be attached to a blimp for use in coastal defense patrols.

beginning production on the contract involved.

"However, manufacturer X may have a sufficient quantity of the necessary material on hand, in inventory, which he could use to start production on the contract. It may save considerable time if he uses the inventory material and then, when the preference-rated material arrives in his plant, use this to replace the stock already used up."

OPM warned that the interpretation was applicable only to current production where there is definite identification of the defense item against which a preference rating has been obtained or applied for. The priorities division is known to feel that deliveries are sometimes delayed even when an order bears a preference rating, and that there is no point in holding up a defense contract until the rated material has physically arrived in the plant if stock on hand can be used and then replaced.

Export Control Booklet Issued by Maxwell

••• Monthly publication of a pamphlet containing a comprehensive schedule of commodities and their forms, conversions, and derivatives subject to export control has been announced by Brig. Gen. Rus-

sell L. Maxwell, Administrator of Export Control. In addition, the pamphlet carries general information and regulations pertaining to export control.

All commodities listed are alphabetized by groups as well as individually. As an example, an exporter of iron and steel products will find those items listed under "Iron and Steel." Particular iron and steel items, such as forms or conversions of those commodities, are listed separately from their groups in alphabetical order.

Industrial Milestones

••• On July 20, the Philadelphia Quartz Co., Philadelphia, celebrated the 110th anniversary of its founding. Thomas W. Elkinton, president of the company, is the great-grandson of Joseph Elkinton, who founded the firm, then a soap company, in 1831. In 1858 the firm started experiments with silicate of soda, and the present name was first used in 1864. Soap manufacture was discontinued in 1904, when the company was incorporated. The firm today has nine plants, with general offices in Philadelphia, and is affiliated with the Philadelphia Quartz Co. of California, Ltd.

C-I Will Build New Blast Furnaces; Bessemers

Pittsburgh

• • • With construction of two bessemer converters having a total annual capacity of 675,000 tons having been approved by Jesse Jones for the Edgar Thomson works of Carnegie-Illinois Steel Corp., total steel ingot additions so far amount to 2,475,000 tons for the U. S. Steel Corp. plants at Pittsburgh. A previous announcement indicated the construction of 1,700,000 tons of annual ingot capacity at Homestead and 100,000 tons annual capacity of electric steel at Duquesne, Pa.

The ingot capacity additions at these three plants will raise the Pittsburgh district ingot capacity figure by 12½ per cent and will, without doubt, leave this district as the largest raw and finished steel center. When all production plans are completed, the Pittsburgh district will probably be found to have a larger percentage of the nation's steel ingot capacity than is now the case.

It is understood that the Defense Plant Corp. will retain title to these expansions and will do the financing, but the company, it is said, will have an option on the projects which will allow them to purchase the plants if they so desire within the next five years. Approximately 4400 additional employees will be required to maintain the new equipment.

Sequence of Deliveries In Pig Iron Order M-17

• • • The OPM's General Preference Order M-17, putting pig iron under full priority control, outlines the following sequence of deliveries:

"Every delivery under a defense order shall be made in preference to deliveries under other orders whenever, and to the extent, necessary to fulfill the delivery schedule provided in the preference rating certificate covering such delivery, or in the contract or purchase order if no certificate has been issued. Deliveries bearing no preference rating or lower preference rating shall be deferred to the extent necessary to assure those deliveries bearing higher preference ratings, even though such deferment may cause defaults under existing contracts or purchase orders. Each person who has defense orders on hand must so schedule his production and deliveries that deliveries under Defense Orders will be made on the dates required, giving precedence in case of unavoidable delay to deliveries bearing the higher preference ratings.

"The sequence of deliveries bearing the same preference rating shall be governed by the delivery dates specified in the respective preference rating certificates assigned thereto, or if the ratings were assigned by order or direction of the Director of Priorities, but no certificates were issued, then by the

dates specified in the contracts or purchase orders. In any case where both preference ratings and delivery dates are the same, and it is impossible to make all deliveries on schedule, the matter is to be referred to the Division of Priorities for determination."

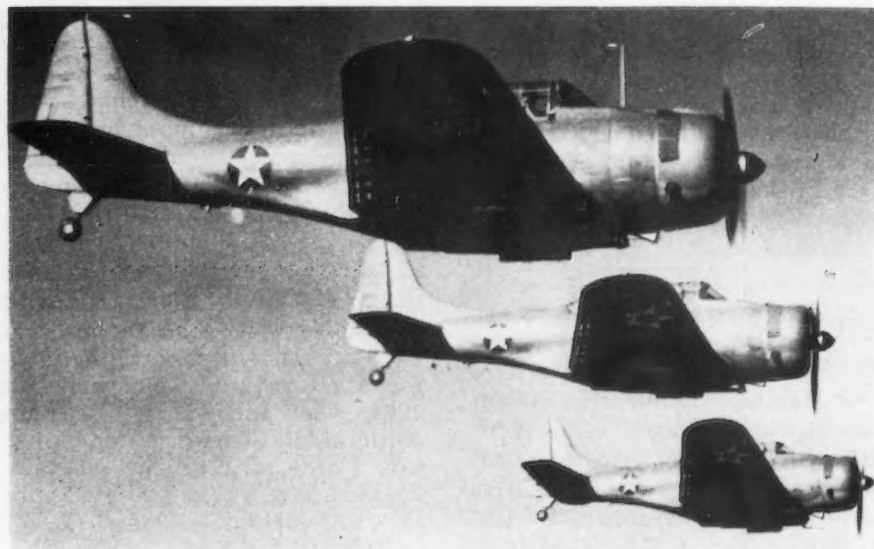
Way Sought for Heavier Steel Car Schedules

Pittsburgh

• • • According to informed sources, OPM, car building, and steel officials are attempting to work out some solution which will allow car building operations as a whole to step up substantially greater than the average level of 50 per cent which is now being maintained.

According to a check made by THE IRON AGE, freight car building situation has not changed in the past several weeks from the status described in THE IRON AGE of July 17, p. 83. The freight car building industry as a whole is still operating at an average of 50 per cent of capacity, due to inability to obtain sufficient steel. The capacity of freight car shops, excluding the railroads' own shops, is estimated at approximately 500 cars a day, hence there has been for some time a potential loss of close to 200 cars a day which have not been built because of lack of supplies, according to authoritative information.

U. S. DIVE BOMBERS: These two-place, all-metal A-24 dive bomber monoplanes, built at the El Segundo, Cal., plant of Douglas Aircraft Co., are said to be able to out-perform the famous German Stukas.



104B—THE IRON AGE, August 7, 1941

OPM and OPACS Seek Business Executives for Government Jobs

Washington

• • • The apparent reticence of employees in private industry to accept jobs as trained specialists with the government at salaries ranging from \$2,600 to \$6,500 has prompted OPM and OPACS to launch an intensive recruiting drive.

Apologetic lest their pleas be interpreted as likely to cripple defense industry by luring key administrative and technical personnel to government service, Director General William S. Knudsen and Price Administrator Leon Henderson said in a joint statement that both agencies expect to employ several hundred business specialists.

OPACS Charges Scrap Monopoly, Asks Justice Dept. To Investigate

Washington

• • • A Justice Department investigation of alleged monopolistic practices in the scrap iron and steel trade was under way this week at the request of Price Administrator Leon Henderson, who charged that "probable violations of the anti-trust laws" have resulted in artificial raising of scrap prices above government-fixed levels and curtailment of scrap supplies.

Henderson's action was interpreted as an answer to recent complaints that his April 3 order fixing prices on iron and steel scrap is not being enforced, and that many consumers are paying more for scrap than the price fixed by OPACS.

It also was regarded as significant that Henderson's recommendations were made while OPACS was under implied criticism by the Institute of Scrap Iron and Steel for an alleged failure to accept the experience and practical recommendations made by a scrap and steel

For description of procedure to be used by Justice Department in acting on such requests by OPACS, see page 94C, THE IRON AGE, May 29, 1941.

mill advisory committee, and while OPACS faced the difficult job of justifying his price-fixing activities to members of Congress, some of whom are known to be hostile to OPACS and to Henderson himself.

The OPACS request for Justice Department action was the first to be taken under a working arrangement adopted on May 16 by the two agencies under which the Henderson organization was equipped "in appropriate cases" with the Justice Department's anti-trust enforcement machinery.

In recommending the scrap investigation, Mr. Henderson did not specifically seek Justice Department aid in enforcing the scrap price fixing schedule but limited his request to cover alleged monopolistic practices.

"We are informed that there are approximately 15 large brokers of iron and steel scrap who supply all the steel mills, the principal consumers of scrap, with approxi-

mately 90 per cent of their needs," Henderson wrote to Acting Attorney General Francis Biddle, of the Department of Justice. "These brokers in turn obtain their scrap supply through dealers who purchase from sub-dealers and so on down the line to the producer of the scrap."

"It is my understanding that certain of these brokers and deal-

OPACS Seeks To Hide Failure, Barringer Says

Washington

• • • Charges that OPACS has stymied every move designed to keep an ample supply of scrap flowing to consumers and that Price Administrator Leon Henderson's request for an anti-trust investigation of the scrap iron and steel trade is a smoke screen behind which he seeks to hide OPACS failure from public view were made on Tuesday by Edwin C. Barringer, executive secretary of the Institute of Scrap Iron and Steel.

In a strongly-worded statement, Barringer forecast that the Justice Department inquiry launched by Henderson will, by injecting legal uncertainties, "tend to freeze the supply of scrap instead of causing it to flow more freely."

The Institute, which was not named in Henderson's complaint, is not defending any violations of law, Barringer said. "But the recent attack can only be interpreted as a smear against the entire industry since Henderson has been taking evident delight in making it his whipping boy."

Such threats as those made by Henderson, Barringer added, "will never cover up the damage done to the steel industry by Henderson's division, they will never clarify the confusing price schedules which Henderson's own lawyers cannot interpret, nor undo the inexperience of OPACS price experts who have been issuing ukase after ukase."

ers have subsidized secretly other dealers and subdealers, sometimes as many as a hundred or more. In this way a single broker has, in some instances, achieved a monopoly over all of the scrap produced in an entire region. This control over the supply of scrap has been utilized as a means for enhancing scrap prices.

"Inasmuch as the increased production for defense has been a se-

rious drain upon the supply of iron and steel scrap, these subsidies, secretly maintained, have enabled certain brokers and dealers to impose upon the consumer excessive prices. Such a dealer or broker has thus been able to create a structure which permits arbitrary control over price, manipulation of scrap supply and degradation of its quality.

"Furthermore, the control thus exercised through these combinations has, by inviting the expectation of increased prices, encouraged the hoarding of iron and steel scrap, and thus seriously shortened an already reduced supply."

Lack of Scrap May Force Lukens Shutdown

Coatesville, Pa.

• • • A definite shutdown of steel making facilities is facing the Lukens Steel Co., due to lack of scrap and pig iron. According to Hugh Kenworthy, purchasing agent, unless more scrap and pig iron becomes available within the next two or three weeks, a serious interruption of national defense business will result. The inflow of scrap, he said, is only sufficient to maintain 50 per cent operations and inventories will soon be completely exhausted. By the end of this month it is said the company will also be seriously hampered by lack of pig iron supplies.

No reserve supply of pig iron now exists and the company is working from hand to mouth, but when previous commitments are completed this month no sources of supply will be available unless relief is obtained from Washington, it was said. The company is now operating at 100 per cent capacity.

Mr. Kenworthy charged that the government scrap fixing program had discouraged dealers from collecting scrap and that exports to Japan which have been halted recently had reduced the nation's overall supply.

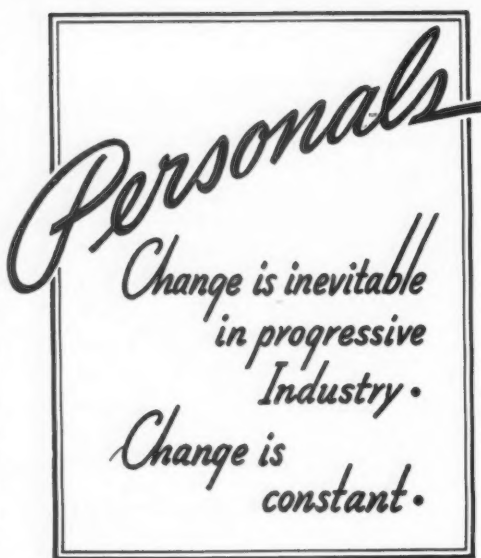
Bids Exceed OPACS Prices

Detroit

• • • Prices far out of line with government established maximums on scrap material were bid on a city list of about 2000 tons of material offered for sale by the Detroit Street Railway.

• **L. B. Worthington** has been appointed manager of sales, bar, strip and semi-finished materials division, Carnegie-Illinois Steel Corp., Pittsburgh. Mr. Worthington, who succeeds the late Thomas J. Bray, Jr., will maintain his headquarters at the company's offices in Pittsburgh. Beginning at the South Chicago works as a sales apprentice immediately after his graduation from the University of Illinois in 1923, Mr. Worthington's entire business career has been spent with the Carnegie-Illinois Steel Corp. Later he served in various positions in the general sales department in Chicago, becoming assistant manager of sales, Chicago district sales office in 1934. In 1935 he was made manager of sales of the St. Paul district sales office and a year later he became assistant manager of sales in Detroit, the position he has held until the present time.

• **Victor H. Lawrence**, heretofore assistant to the executive vice-president of Alan Wood Steel Co., Conshohocken, Pa., has become associated with Otis Steel Co., Cleveland, as assistant to the president. After completing his technical training at Carnegie Institute of Technology and the Graduate School of the University of Pennsylvania, he became associated with Minnesota Steel Co. and the



Mayville Iron Co. From 1920 to 1926 he served as assistant to the works manager of Jessop Steel Co., Washington, Pa., and later joined Alan Wood Steel Co. as metallurgical engineer.

• **J. B. Walker**, since 1939 manager of the generator section in the transportation and generator division of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been named sales manager of the division. He has been identified with the company since his graduation from the University of Arkansas in 1925. **A. C. Meixner**

succeeds Mr. Walker as manager of the generator section.

• **Frank R. Burnette**, construction superintendent for the Carnegie-Illinois Steel Corp. since 1939, has been made assistant chief engineer. Associated with subsidiary companies of United States Steel Corp. for many years, Mr. Burnette was first employed at the Farrell, Pa., works in 1905. He later joined Illinois Steel Co. and in 1916 became successively assistant coke works superintendent, superintendent of construction and assistant chief engineer, before being transferred to Carnegie-Illinois as construction superintendent.

• **Robert B. Whyte**, general superintendent of Macwhyte Wire Rope Co., Kenosha, Wis., has been elected vice-president in charge of operations. He joined the wire and wire rope industry in 1913 after his graduation from Cornell University, with a degree in mechanical engineering.

• **H. Edgar Lewis**, president of Jones & Laughlin Steel Corp., Pittsburgh, has been appointed to the Office of Production Management's Steel Defense Advisory Committee.

• **F. G. Gardner**, of the engineering staff of the Kellogg Switchboard & Supply Co., Chicago, has



L. B. WORTHINGTON, manager of sales, bar, strip and semi-finished materials division, Carnegie-Illinois Steel Corp., Pittsburgh.



VICTOR H. LAWRENCE, assistant to the president, Otis Steel Co., Cleveland.



J. B. WALKER, sales manager of the transportation and generator division of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

been appointed acting chief engineer. **George R. Eaton**, vice-president in charge of engineering, is taking a leave of absence because of ill health. Mr. Gardner has had a long experience in the electrical communications industry.

• **John Heywood Smith**, who recently joined the Cramp Shipbuilding Co., Philadelphia, as assistant to the president, has been made manager of procurement in charge of all purchases and store-keeping activities, succeeding H. W. Schweizer. For the past four years he has been a member of the teaching staff of the Wharton School of Finance of the University of Pennsylvania.

• **Jack Gutstadt** has left the employ of the Chicago Journal of Commerce, after serving that newspaper as editor of the scrap iron and industrial salvage department for five years. He is now connected with the Western Metal Co., Chicago.

• **D. T. Haddock** has been placed in charge of the newly-opened Washington office of A. Milne & Co., New York. Headquarters will be in the Barrister Building.

• **Harold H. Seaman**, former president of the Seaman Body Corp., Milwaukee, has been appointed deputy co-ordinator in charge of the Milwaukee Office of Production Management to be located at 735 North Water Street. In active charge of office work will be **Clifford E. Ives**, president of the Ives Engineering Laboratories, Wilmette, Ill.

• **C. B. Voldrich** has been named research engineer on the technical staff of Battelle Memorial Institute, Columbus, Ohio, where he will assist in the institute's program of welding research. Before joining the Battelle staff he was associated for four years with the Navy's Bureau of Ships. Earlier he was a research engineer with the A. O. Smith Corp., Milwaukee.

• **Andrew W. Liger** has joined the research staff of Battelle Memorial Institute, being assigned to the division of electrochemical research. Mr. Liger was formerly associated with the W. B. Jarvis Co., Grand Rapids, Mich., and is a graduate of the Michigan College of Mining and Technology.

• **C. C. Brownley** has been added to the sales staff of Milby-McKinney, Baltimore.

• **Richard B. Engdahl**, formerly research assistant and member of the faculty of the University of Illinois of which he is a graduate, has been appointed to the research staff of Battelle Memorial Institute, Columbus, Ohio. He has been assigned to the division of fuels research and will assist in an investigation of the use of pulverized fuel for the firing of ceramic and metallurgical furnaces.

• **Irving Ruder** has resigned from his position as manager of the warehouse department of Iron & Steel Products, Inc., Chicago.

Obituary

• **Louis H. Mesker**, Cleveland consulting engineer, died on Aug. 1. His career included service as a foreman of the Macbeth Iron Co.; engineering director of Norwalk Mfg. Co.; manager of the Cincinnati office of Motch & Merryweather Machinery Co. and of the St. Louis office of Manning, Maxwell & Moore. He returned to Cleveland to manage the branch office of Kearney & Trecker Co. and later became sales manager of the Cleveland Milling Machine Co. He helped form the Shields Machine Co. and later became vice-president and sales manager of Clark-Mesker Co. In 1925 he became an official of Cleveland Planer Co. Recently he had acted as representative for plastic machine division of Reed-Prentice Corp.

• **Richard F. Greenfield**, aged 76 years, foundry superintendent of the American Manganese Steel Division's Oakland, Cal., plant, died July 27 at his home in Piedmont, Cal. He had been with the Oakland plant since 1922, coming there from the company's Chicago Heights, Ill., plant. He had been associated with the firm since 1911.

• **Charles D. Rawstorne**, blast furnace designer until his retirement about one year ago, died on July 31 at his home near Pittsburgh. Mr. Rawstorne, who was born in Boston, was graduated from

• **Arthur S. Goble**, who has been connected for many years with various sales activities of Baldwin Locomotive Works, Eddystone, Pa., has been made assistant manager of the Chicago district office. **Curtis G. Green**, formerly connected with the St. Louis and Chicago district offices has been appointed manager in charge of diesel locomotive sales, with headquarters at Eddystone, Pa.

• **George B. Ewing, Jr.**, has joined the staff of sales engineers attached to the Houston, Tex., office of the Foxboro Co., Foxboro, Mass.

Brown University as a civil engineer, and was later identified with several railroads. He was vice-president of the Freyn Engineering Co., Chicago, from 1917 to 1922, when he became connected with McClintic - Marshall Corp. When the latter firm was merged with Bethlehem Steel Co. in 1931, Mr. Rawstorne continued with the consolidated company.

• **Frank E. Woller**, in charge of employment and production of the foundry division, Grede Foundries, Inc., Milwaukee, for about 23 years, died July 29, at his home in Milwaukee, aged 82 years.

• **William Lauber**, founder and former president of the Lauber Handle Mfg. Co., Milwaukee, died July 25 at his home there, aged 68 years. He was with Allis-Chalmers Mfg. Co. and International Harvester Co. before organizing his own company from which he retired about a year ago.

• **James McNair Buick**, former vice-president of the American Car & Foundry Co., died recently in New York, his home for the past 18 years. A cousin of the late David D. Buick, founder of the automobile company that bears the Buick name, James McNair Buick was born in Detroit 76 years ago.

• **Major Robert P. Triggs**, assistant manager of the U. S. Army Air Corps Central Procurement District, died in Detroit on July 25. Maj. Triggs, 52 years old, was born in Grand Rapids, Mich. For 22 years he had been in the Air Corps on engine inspection.

• **William A. Pungs**, 92 years old, retired banker and industrialist,

died recently in Detroit. Mr. Pungs, born in Germany and brought to Detroit when he was three years old, became active in the automobile industry at the turn of the century. He headed the old Michigan Yacht & Power Co., the Pungs-Finch Automobile Co. and the Central Savings Bank.

- **Louis Jaenichen, Sr.**, a leader in the manufacturing of cash registers and computing scales, died recently. Born in Germany in 1864, he came to this country in 1876. He was one of the organizers of the Standard Computing Scale Co., of which he was general superintendent at the time of his death.

- **Max A. Schutz**, for 12 years structural engineer of the Great Lakes Steel Corp., died July 20. Mr. Schutz, who was born in Copenhagen, Denmark, 51 years ago, had also been employed as structural designer at Youngstown Sheet & Tube Co., Youngstown, Ohio, and General Electric Co., Pittsfield, Mass.

- **Christer Peter Sandberg**, engineer and metallurgist, died in June at his home at Edenbridge, England. Mr. Sandberg, who was born in Sweden 65 years ago, was a partner in the family steel rail manufacturing firm. He invented a number of processes for increasing the wearing and resisting capacity of rails and for reclaiming high-explosive shell forgings which had been rejected as defective. He was consulting and inspecting engineer to the Chinese State Railroad, the Siamese State Railroad and many British and other foreign lines.

- **Meredith N. Bailey**, assistant manager of American Meter Co.'s Philadelphia plant, died July 24 at his home in Royersford, Pa., aged 61 years. Prior to 1916, Mr. Bailey was employed by the Keystone Meter Co.

- **Col. John Adam Smith**, founder in 1897 of the United States Electrical Tool Co., Cincinnati, died July 24. He was born 76 years ago in New Richmond, Ohio. Col. Smith contributed many inventions to the industry in which he pioneered. Prior to founding his tool company, he was chief engineer of the Wadsworth Watch Case Co., Dayton, Ky.

A-1-a Rating for Cutting Tool Makers' Suppliers

Washington

• • • A limited blanket preference rating, permitting 100 cutting tool manufacturers to apply a rating of A-1-a to deliveries from their suppliers, has been issued by OPM's priorities division. Similar in form to other limited blanket preference orders previously issued, the new order affects material going into cutting tools. A July 25 order on cutting tools related only to the distribution of these tools when completed.

Under the provisions of the latest order, suppliers may extend the A-1-a preference rating to their own suppliers, but the rating is to be used by the manufacturers only for the production of specified defense products. These defense products are defined as including:

"Drills of all types and sizes; reamers; countersinks; counterbores; milling cutters of all sizes and types; hobs of all sizes and types; taps; high speed chasers for self-opening die heads; high speed chasers for collapsing taps; machine broaches; and cemented carbide cutting tools of all types."

The rating may only be applied

to deliveries of certain materials specified in Exhibit A as follows:

High speed steel, carbon tool steel and alloy steel bars, sheets, rods, shapes, forgings and castings; cutting tools, including cemented carbides; abrasives; measuring instruments and gages; maintenance and shop supplies necessary for proper operation and maintenance of equipment and facilities.

Australia Studies Sheet Aluminum Industry

Washington

• • • Establishment of a sheet aluminum industry in Australia is under consideration, according to Australian reports, announced by the Department of Commerce. The possibility of utilizing Australian deposits of bauxite is also being investigated. The plant of the Australian Aluminum Co., at Granville, New South Wales, will produce structural shapes from imported ingot aluminum. The British Aluminum Co., the Aluminum Ltd. of Canada, the Electrolytic Zinc Co., Ltd., and the Metal Manufacturers Ltd., are reported to be shareholders in the Granville enterprise.

Basic Open Hearth

(CONTINUED FROM PAGE 40)

great deal of slag, tending to become high both in lime and iron oxide. In addition the porosity of the working face falls from about 30 per cent down to as low as 1 per cent. Much remains to be understood regarding the precise mechanism whereby wear takes place, but there is little doubt that it is due in the main to a lowering of the refractoriness of the hearth by the fluxes absorbed and subsequent softening and wearing away of the top layers.

The changes undergone by magnesite hearths during use have been very clearly discussed and illustrated by Andersen who shows that the periclase absorbs large amounts of iron oxide, the proportion present in the upper layers of an old bottom being as great as 50 per cent. Andersen also shows that as the bottom recrystallizes the original periclase grains gradually join up producing a continuous network, the interstices of which con-

tain the fluid silicates and calcium ferrite. As with induction furnaces, the reducing conditions associated with the molten metal influence the state of oxidation of iron in the bottom, iron often occurring as FeO in solid solution in the magnesia or with dolomite hearths in both the magnesia and the lime.

(D) LINES OF IMPROVEMENT:

(1) The production of bottoms of higher packing density by the use of suitably graded material of high sintering tendency.

(2) Improved drainage of the hearth due to the maintenance of the correct contour and of a high temperature, particularly in the tap hole region, after casting.

(3) The use of improved fettling material showing a higher angle of rest, less segregation and consequently a higher effective packing density, either as a result of improved grading or bond addition.

Ed. Note: In the second section, next week, the author gives data on the gas and air uptakes, and slag pockets.

July Pig Iron Output, at 97.3%, Sets New Record

... Production of coke pig iron in July totaled 4,770,778 net tons, a new peak, compared with 4,553,165 tons in June, according to reports to THE IRON AGE. Output on a daily basis last month showed a gain of 1.4 per cent over that in June or from 151,772 tons to 153,896 tons a day in July. The operat-

ing rate for the industry was 97.3 per cent of capacity in July, compared with 95.9 per cent in June.

There were 211 furnaces in blast on Aug. 1 which were producing at the rate of 153,190 tons a day, compared with the production rate on July 1 of 153,600 tons. United States Steel Corp. took one furnace

off blast, independent producers blew in two furnaces and one merchant furnace was taken off.

The two furnaces blown in were: one, Bethlehem Steel Co., and one Aliquippa, Jones & Laughlin Steel Corp. Furnaces blown out include one Carrie, Carnegie-Illinois Steel Corp., and one Woodward Iron Co.

Production of Coke Pig Iron and Ferromanganese

	Pig Iron*		Ferro-Mn†	
	1941	1940	1941	1940
January	4,663,695	4,032,022	35,337	43,240
February	4,197,872	3,311,480	33,627	38,720
March	4,704,135	3,270,499	55,460	46,260
April	4,334,267	3,137,019	56,871	43,384
May	4,599,966	3,513,683	58,578	44,973
June	4,553,165	3,818,897	53,854	44,631
½ year	27,053,100	21,083,600	293,727	261,208
July	4,770,778	4,053,945	57,710	43,341
August	.....	4,238,041	.....	37,003
September	.....	4,176,527	.....	33,024
October	.....	4,445,961	.....	32,270
November	.....	4,403,230	.....	31,155
December	.....	4,547,602	.....	35,666
Year	.....	46,948,906	.....	473,667

*These totals do not include charcoal pig iron. †Included in pig iron figures.

Daily Average Production of Coke Pig Iron

	Per Cent Capacity		Per Cent Capacity	
	1941	1940	1941	1940
January	150,441	95.5*	130,061	85.8
February	149,924	95.2	114,189	75.1
March	151,745	96.9	105,500	68.9
April	144,475†	91.8†	104,567	68.6
May	148,386	93.8	113,345	74.8
June	151,772	95.9	127,297	83.9
½ year	149,465	94.5	115,844	76.1
July	153,896	97.3	130,772	86.3
August	.....	.....	136,711	90.4
September	.....	.....	139,218	92.2
October	.....	.....	143,418	94.8
November	.....	.....	146,774	97.1
December	.....	.....	146,697	97.2
Year	.....	.....	128,276	84.6

*Revised for capacity as of Dec. 31, 1940. †Revised.

Merchant Iron Made, Daily Rate

	1941	1940	1939
January	20,812	16,475	11,875
February	21,254	14,773	10,793
March	23,069	11,760	10,025
April	20,434	13,656	9,529
May	21,235	16,521	7,883
June	21,933	13,662	8,527
July	21,957	16,619	9,404
August	.....	17,395	11,225
September	.....	17,571	12,648
October	.....	18,694	16,409
November	.....	22,792	16,642
December	.....	19,779	16,912

Production by Districts and Coke Furnaces in Blast (In Net Tons)

	July, 1941		Daily % of Capacity	June, 1941		Daily % of Capacity	July 1, 1941		No. in Blast	Aug. 1, 1941		No. in Blast	July 1, 1941	
	Production	Capacity		Production	Capacity		Operating Rate	Rate		Operating Rate	Rate		Operating Rate	Rate
Eastern	29,648	80.9		30,996	87.4		13,189	955	2	955	1,030	2	1,030	1,030
Buffalo	294,165	96.8		286,296	97.3		268,610	9,490	14	9,490	9,545	14	9,545	9,545
Philadelphia	411,851	89.0		385,876	86.2		370,409	13,350	18	13,350	13,015	17	13,015	13,015
Ferro. and Spiegel	16,255	99.0		17,247	108.4		10,911	525	4	525	575	4	575	575
Pittsburgh	1,157,916	97.3		1,086,605	94.3		994,037	36,980	45	36,980	36,995	47	36,995	36,995
Ferro. and Spiegel	39,297	90.8		34,697	82.6		28,830	1,270	6	1,270	1,155	4	1,155	1,155
South Ohio River	97,760	89.8		98,130	93.1		94,697	3,155	7	3,155	3,270	7	3,270	3,270
Valleys	600,709	102.9		567,817	100.5		490,956	19,380	25	19,380	19,825	25	19,825	19,825
Wheeling	214,138	104.3		208,126	104.7		151,385	6,910	9	6,910	6,940	9	6,940	6,940
Cleveland	415,293	101.2		405,298	102.6		323,950	13,395	17	13,395	13,510	17	13,510	13,510
Chicago	1,030,498	97.3		999,555	97.5		862,640	33,240	39	33,240	33,320	39	33,320	33,320
St. Louis	.....	.....		.....	.....		.....	.....	0	.....	.....	0	.....	.....
Detroit	102,543	88.4		84,705	75.4		97,541	3,310	4	3,310	2,825	4	2,825	2,825
Western	68,627	109.2		52,974	87.1		53,489	2,215	4	2,215	1,765	4	1,765	1,765
Ferromanganese	.....	.....		.....	.....		.....	.....	0	.....	.....	0	.....	.....
Southern	289,920	97.4		292,933	101.6		283,679	8,945	16	8,945	9,765	17	9,765	9,765
Ferromanganese	2,158	23.4		1,910	21.8		5,804	70	1	70	65	1	65	65
Total	4,770,778	97.3		4,553,165	95.9		4,053,945	153,190	211	153,190	153,600	211	153,600	153,600

C-I to Open 10 Hot Mills At Shenango Tin Plate Unit

Increased tin plate demand both from Great Britain and at home, and capacity operations at cold reduction tin plate mills, has forced Carnegie-Illinois Steel Corp. to schedule for operation Aug. 18, the remaining 10 hot mills at its Shenango tin plate plant at New Castle, Pa. This latest addition will result in complete operation there for the first time since late 1939.

The Shenango plant is the only remaining Carnegie-Illinois tin plate works capable of producing hot rolled tin plate, which in recent

years has given way to tin plate made on cold reduction mills from strip obtained from high speed continuous hot mills.

Willys Gets Jeeps Order

Washington

A contract for \$13,411,864 for ¼-ton reconnaissance trucks has been awarded to Willys Overland Co., Toledo, Ohio, the War Department has announced.

These reconnaissance trucks are familiarly known as Jeeps, and have received acclaim for their performance under all conditions and over all types of terrain.

\$86 Million Iowa Ordnance Plant Contract Is Awarded

Washington

The War Department has announced a contract for the management, operation and construction of the Des Moines, Iowa, ordnance plant. The United States Rubber Co., of New York, was given the prime contract at a total amount of \$86,058,331. Under the contract, sub-contracts for the construction work will be awarded later. Approximately \$57,500,000 will be used for the first year's operation, and is estimated to provide for one year's maximum capacity production.

The Iron Age Comparison of Prices

Advances Over Past Week in Heavy Type; Declines in Italics

	Aug. 5, 1941	July 29, 1941	July 8, 1941	Aug. 6, 1940
Flat Rolled Steel:				
(Cents Per Lb.)				
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Tin and Terne Plate:				
(Dollars Per Base Box)				
Tin plate	\$5.00	\$5.00	\$5.00	\$5.00
Manufacturing ternes ...	4.30	4.30	4.30	4.30
Bars and Shapes:				
(Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Wire and Wire Products:				
(Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails:				
(Dollars Per Gross Ton)				
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel:				
(Dollars Per Gross Ton)				
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Wire Rods and Skelp:				
(Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

Pig Iron:

	Aug. 5, 1941	July 29, 1941	July 8, 1941	Aug. 6, 1940
(Per Gross Ton)				
No. 2 fdy., Philadelphia...	\$25.84	\$25.84	\$25.84	\$24.84
No. 2, Valley furnace...	24.00	24.00	24.00	23.00
No. 2, Southern Cin'ti...	24.06	24.06	24.06	23.06
No. 2, Birmingham	20.38	20.38	20.38	19.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	23.00
Basic, del'd eastern Pa...	25.34	25.34	25.34	24.34
Basic Valley furnace ...	23.50	23.50	23.50	22.50
Malleable, Chicago† ...	24.00	24.00	24.00	23.00
Malleable, Valley	24.00	24.00	24.00	23.00
L. S. charcoal, Chicago ..	31.34	31.34	31.34	30.34
Ferromanganese†	120.00	120.00	120.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.

Scrap:

	Aug. 5, 1941	July 29, 1941	July 8, 1941	Aug. 6, 1940
(Per Gross Ton)				
Heavy melt'g steel, P'gh.	\$20.00	\$20.00	\$20.00	\$18.25
Heavy melt'g steel, Phila.	18.75	18.75	18.75	19.00
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	17.25
Carwheels, Chicago .....	...	...	...	18.25
Carwheels, Philadelphia ..	...	...	...	20.75
No. 1 cast, Pittsburgh...	22.00	22.00	22.00	19.75
No. 1 cast, Philadelphia...	24.00	24.00	24.00	21.25
No. 1 cast, Ch'go*.....	21.00	21.00	21.00	16.75

*Changed to gross ton basis.

Coke, Connellsville:

	Aug. 5, 1941	July 29, 1941	July 8, 1941	Aug. 6, 1940
(Per Net Ton at Oven)				
Furnace coke, prompt ...	\$6.125	\$6.125	\$6.125	\$4.25
Foundry coke, prompt...	6.875	6.875	6.875	5.25

Non-Ferrous Metals:

	Aug. 5, 1941	July 29, 1941	July 8, 1941	Aug. 6, 1940
(Cents per Lb. to Large Buyers)				
Copper, electro., Conn.*	12.00	12.00	12.00	11.50
Copper, Lake, New York	12.00	12.00	12.00	11.50
Tin (Straits), New York	51.75	53.50	53.125	52.25
Zinc, East St. Louis.....	7.25	7.25	7.25	6.25
Lead, St. Louis	5.70	5.70	5.70	4.85
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

*Mine producers only.

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 136-142 herein. On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Composite Prices

FINISHED STEEL				PIG IRON				SCRAP STEEL			
August 5, 1941.....	2.261c.	a	Lb.....	.....	\$23.61	a	Gross Ton.....	.....	\$19.17	a	Gross Ton.....
One week ago	2.261c.	a	Lb.....	.....	\$23.61	a	Gross Ton.....	.....	\$19.17	a	Gross Ton.....
One month ago	2.261c.	a	Lb.....	.....	\$23.61	a	Gross Ton.....	.....	\$19.17	a	Gross Ton.....
One year ago.....	2.261c.	a	Lb.....	.....	\$22.61	a	Gross Ton.....	.....	\$18.17	a	Gross Ton.....
				High	Low	High	Low	High	Low	High	Low
1941.....											
1940.....	2.261c., Jan. 2	2.211c., Apr. 16		\$23.61, Mar. 20	\$23.45, Jan. 2			\$22.00, Jan. 7	\$19.17, Apr. 10		
1939.....	2.286c., Jan. 3	2.236c., May 16		23.45, Dec. 23	22.61, Jan. 2			21.83, Dec. 30	16.04, Apr. 9		
1938.....	2.512c., May 17	2.211c., Oct. 18		22.61, Sept. 19	20.61, Sept. 12			22.50, Oct. 3	14.08, May 16		
1937.....	2.512c., Mar. 9	2.249c., Jan. 4		23.25, June 21	19.61, July 6			15.00, Nov. 22	11.00, June 7		
1936.....	2.249c., Dec. 28	2.016c., Mar. 10		23.25, Mar. 9	20.25, Feb. 16			21.92, Mar. 30	12.92, Nov. 10		
1935.....	2.062c., Oct. 1	2.056c., Jan. 8		19.74, Nov. 24	18.73, Aug. 11			17.75, Dec. 21	12.67, June 9		
1934.....	2.118c., Apr. 24	1.945c., Jan. 2		18.84, Nov. 5	17.83, May 14			13.42, Dec. 10	10.33, Apr. 29		
1933.....	1.953c., Oct. 3	1.792c., May 2		17.90, May 1	16.90, Jan. 27			13.00, Mar. 13	9.50, Sept. 25		
1932.....	1.915c., Sept. 6	1.870c., Mar. 15		16.90, Dec. 5	13.56, Jan. 3			12.25, Aug. 8	6.75, Jan. 3		
1931.....	1.981c., Jan. 13	1.883c., Dec. 29		14.81, Jan. 5	13.56, Dec. 6			8.50, Jan. 12	6.43, July 5		
1930.....	2.192c., Jan. 7	1.962c., Dec. 9		15.90, Jan. 6	14.79, Dec. 15			11.33, Jan. 6	8.50, Dec. 29		
1929.....	2.236c., May 28	2.192c., Oct. 29		18.21, Jan. 7	15.90, Dec. 16			15.00, Feb. 18	11.25, Dec. 9		
				18.71, May 14	18.21, Dec. 17			17.58, Jan. 29	14.08, Dec. 3		
Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.				Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.				Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.			

Summary of the Week

• Full priority control of pig iron expected to be followed soon by similar action on steel . . . Ingot production climbs a half point to 99½ per cent . . . C-I to build two new blast furnaces . . . Ore shipments and pig iron output set record in July.

FIRST effect of the OPM priority division's action in placing pig iron under full priority control, a long awaited step intended to regulate distribution of the metal to steel plants and foundries holding vital defense orders, was to stimulate efforts of consumers to get iron prior to Sept. 1 and to obtain higher priority ratings for their requirements. The order, known as general preference order M-17, directs pig iron producers to submit to the priorities division by the 15th of each month a proposed schedule of shipments for the following month and instructs buyers of pig iron to order on special forms approved by OPM.

The pig iron control order, destined to offset to a degree an estimated 5,000,000-ton shortage of that material for 1941, stipulates that "defense orders shall be accepted even if acceptance will render impossible, or result in deferment of, deliveries under non-defense orders previously accepted." At the same time the OPM order establishes a pool arrangement under which all producers, during each month beginning with September, must set aside a quantity of pig iron to be specified by the director of priorities and to be allocated by him to meet emergency needs during the following month. Similar priority action is expected soon on steel.

Production of coke pig iron in July did, however, reach a new high level at 4,770,778 net tons, compared with 4,553,165 tons in June, according to an IRON AGE survey. Output on a daily basis last month showed a gain of 1.4 per cent above June or from 151,772 tons in June to 153,896 tons in July. The blast furnace operating rate last month was 97.3 per cent, against 95.9 per cent in the preceding month. On Aug. 1 a total of 211 blast furnaces was melting 153,190 net tons daily.

THE latest in a series of steel industry plant expansions, announced this week, provides for the building of two new blast furnaces at the Edgar Thomson works of Carnegie-Illinois Steel Corp. at Braddock, Pa. This project, which will lift the Pittsburgh district's pig iron capacity by more than 850,000 tons annually, includes construction of two new bessemer converters, with a yearly steel making capacity of 600,000 tons. The Edgar Thomson expansion will cost \$32 million, the expense being met by the government and the plants being operated under lease by Carnegie-Illinois.

Steel production this week advanced a half point to 99.5 per cent from 99 per cent last week with the operating average still a point below the peak of 100.5 per cent reached in the week beginning June 23. The gain is due to a one-point advance at Pittsburgh, a similar increase in the Wheeling-Weirton district to 91 per cent and a rebound in the Buffalo operating rate

to 104.5 per cent from 88 per cent last week. Steel plants in the Chicago, Youngstown and Cleveland areas are operating this week at slightly lower levels. In several areas steel plants are operating below capacity because of inability to obtain scrap of the right grades.

MEANWHILE a showdown is developing this week between the OPACS and the scrap industry following announcement Monday that the Department of Justice would investigate that industry for alleged anti-trust law violation. Such a step might conceivably lay the groundwork for an attempt to hold the scrap trade responsible for any closing of steel plants due to shortage of scrap material, and could also develop into a roundabout method of enforcing the OPACS price ceilings on scrap. From some steel centers it is reported that overgrading of scrap material is spreading, a result being the exceeding of ceiling prices. The seriousness of the deficiency in scrap supplies was highlighted by reports on Tuesday from Lukens Steel Co., operating largely upon defense work, that the company was facing a complete shutdown unless the flow of scrap to its yards was immediately increased.

Structural steel awards of 26,700 tons are almost double the 14,200-ton total of last week, with outstanding lettings including 18,400 tons in Washington and Oregon for transmission line towers for the Bonneville Administration. New structural projects jumped to 37,000 tons from 15,700 tons. Reinforcing steel awards advanced to 25,250 tons from 22,500 tons last week while new reinforcing steel projects, swelled by 22,000 tons for a War Department office building at Washington, soared to 39,475 tons from 11,100 tons last week.

Vessel shipments of Lake Superior iron ore reached a new peak in July at 11,390,488 gross tons. The total for the season to Aug. 1 is 40,216,408 gross tons, a volume well above any like period in history.

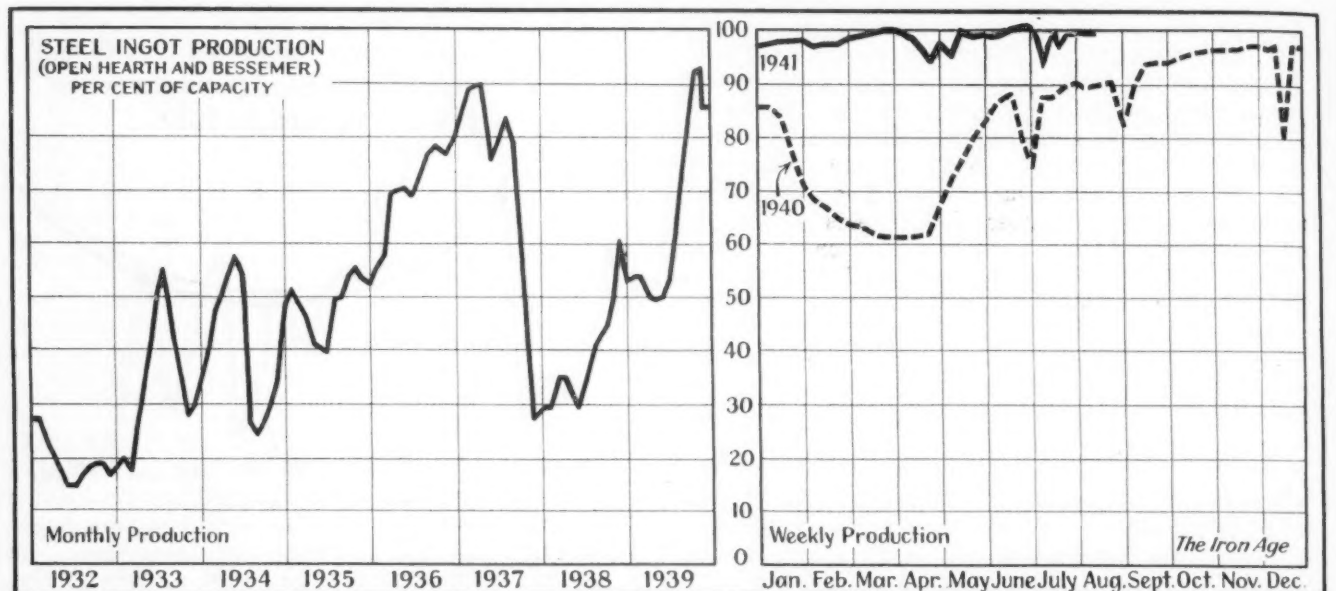
The Industrial Pace . . .

••• Heavy curtailment of automobile production during the past week because of nearly industry wide closing of plants for new model changeovers and a moderate decline in steel ingot production accounted for this week's 7.4 point drop in THE IRON AGE index of capital goods to 119.6 per cent of the 1925 to 1927 base. Automobile production dropped 44 points to 72.6 per cent. A bad mill accident in the Buffalo district that tied up steel making facilities was responsible for the 2.9 point decline of this component, bringing it down to 138.7 per cent.

Construction awards, down 16 per cent from last week's near-record level, are still well above the seasonal norm. Awards for a camp, four defense plants and a storage depot account for 43 per cent of this week's \$173,094,000 worth of contracts.

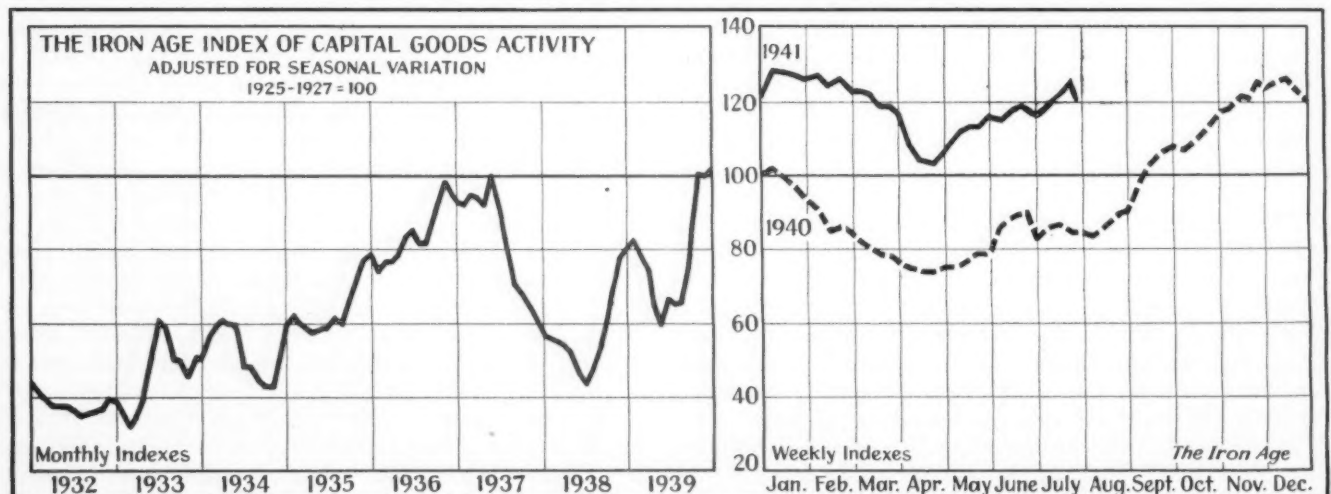
Production and shipments from the Pittsburgh area held steady last week, a slight drop in electric power output and blast furnace activity being offset by a gain in coal production, holding this series at 133.4 per cent.

Steel Rate Gains Half Point to 99.5%



District Ingot Production, Per Cent of Capacity		Pittsburgh	Chicago	Valleys	Philadelphia	Cleveland	Buffalo	Wheeling	Detroit	Southern	S. Ohio	Western	St. Louis	Eastern	Aggregate
Current Week ..		101.0	100.0	98.0	97.5	98.0	104.5	91.0	104.7	95.0	102.0	102.5	111.0	94.0	99.5
Previous Week..		100.0	101.0	99.0	97.5	100.0	88.0	90.0	103.0	95.0	102.0	102.5	111.0	95.5	99.0

Auto Output Drop Forces Index Down 7.4 Points

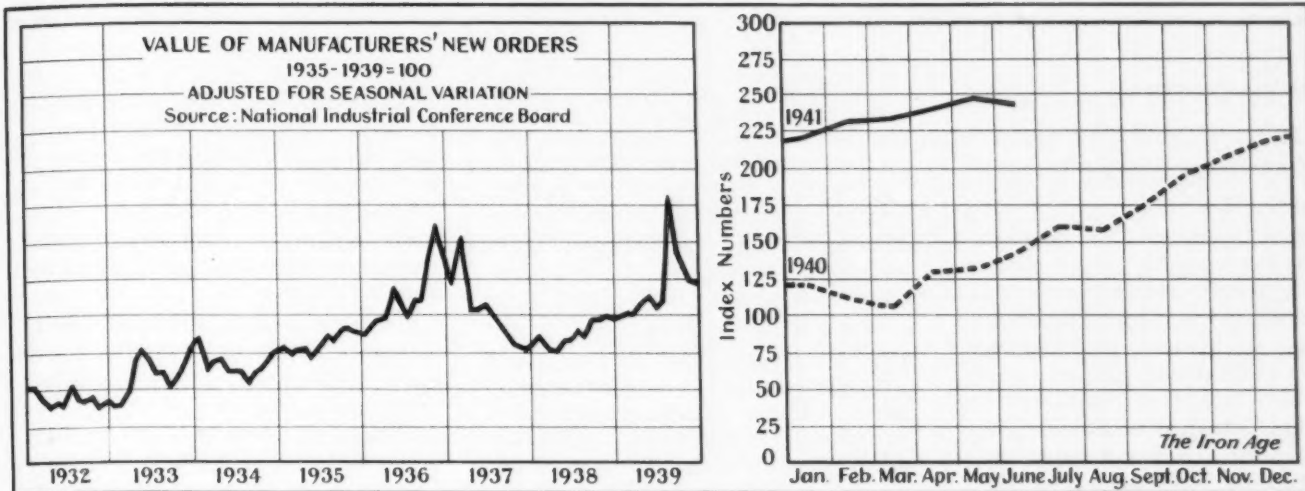


Component	Week Ended	Aug. 2	July 26	July 5	Aug. 3, 1940	Aug. 3, 1929
Steel ingot production ¹		138.7	141.6	137.1	129.3	135.6
Automobile production ²		72.6	116.6	114.5	26.4	118.5
Construction contracts ³		164.3	157.5	120.5	87.1	125.1
Forest products carloadings ⁴		89.2	85.6	85.1	67.9	119.7
Pittsburgh output and shipments ⁵		133.4	133.8*	135.4	110.8	129.8
COMBINED INDEX		119.6	127.0*	118.5	84.3	125.7

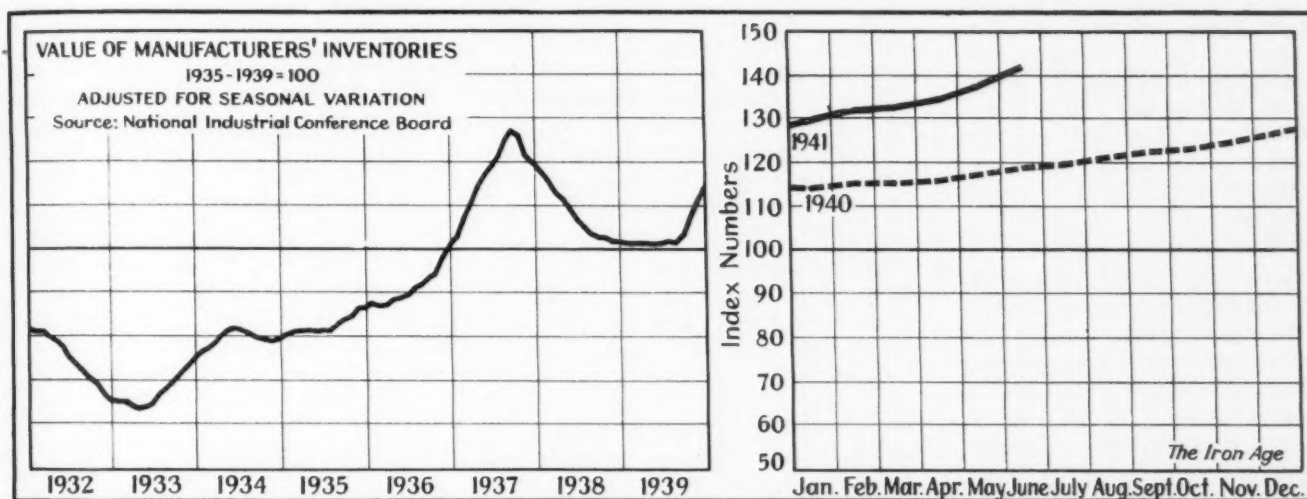
*Revised.

Sources: ¹THE IRON AGE; ²Ward's Automotive Reports; ³Engineering News-Record; ⁴Association of American Railroads; ⁵University of Pittsburgh. Indexes of forest products carloadings and activity in Pittsburgh area reflect conditions as of week ended July 26. Other indexes cover week of August 2.

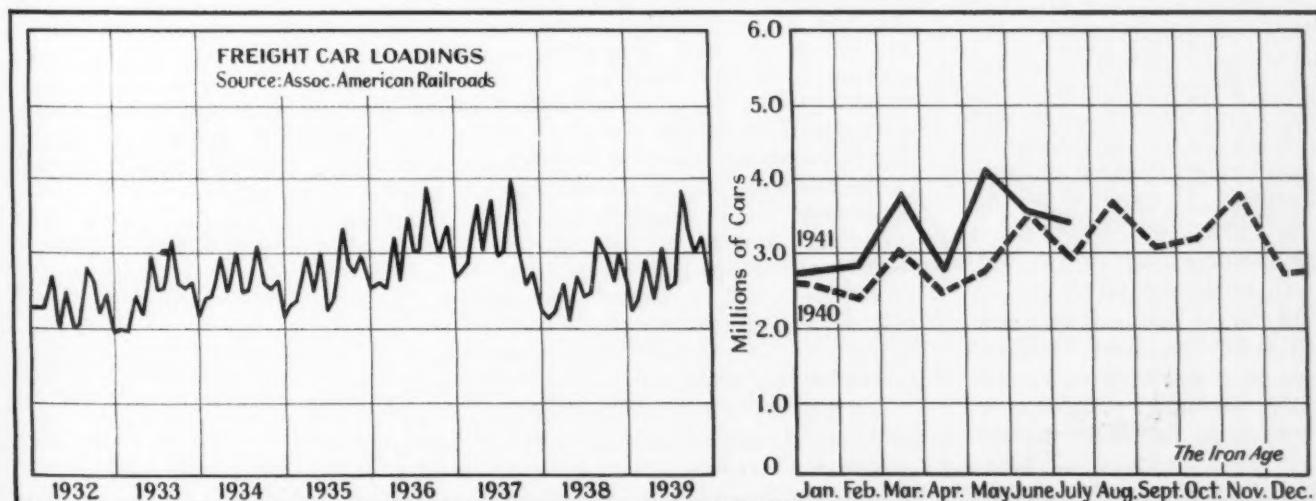
New Orders Down Slightly in June



June Inventory Value Shows Further Gain



Car Loadings Continue to Ease



Market News

...THE WEEK'S ACTIVITIES IN IRON AND STEEL

New Business

... Full steel priorities expected to follow steps on pig iron

Practically all incoming business at PITTSBURGH is carrying a defense label and in some instances, notably plates, current production is entirely given over to direct and indirect defense requirements. Total specifications continue to be well above a volume sufficient for maximum steel production. Steel leaders here look for a more drastic setup in steel priorities soon, similar to the latest order covering pig iron. In the latter case producers are to furnish the government with shipping schedules and after Sept. 1 no one without a priority rating or other approval may obtain pig iron. It is believed here that this same method will soon be applied to steel orders and it is definitely believed also that the new steel priority to come will make some effort to indicate in what order various defense commitments are to be fulfilled.

One large steel company is furnishing the OPM with its complete plate rolling schedule for August and this same company has definitely refused to roll any plates in August except those carrying a priority rating. Some other companies, it is understood, are furnishing Washington with their August rolling schedules on all plate items not carrying a preference rating. These two instances apparently are forerunners of what will soon come to all steel products. The scrutiny by the OPM of contemplated plate shipments not carrying priority ratings, is interpreted here as the possible initial step in arbitrarily taking these items off steel order books and replacing them with defense business. The amount of such items is believed to be small.

Large inquiries for electric furnace steel, shell steel, plates and reinforcing bars were among the highlights of the past week at CLEVELAND. Awards covering ammunition components and aircraft parts have been extensive in Ohio recently. The prospect of being called on to furnish the British

with additional large tonnages of semi-finished steel in fourth quarter faces the steel industry.

Actual orders placed recently on mill books are just as heavy as ever, but the volume from normal peacetime consumers has dropped. Government defense business more than makes up the difference.

Many steel users engaged in the defense program are finding their priority ratings too low for prompt service. Often an A-5 rating proves not high enough to secure deliveries desired. Steel mills engaged in expansion are having just as much difficulty getting needed supplies as anyone else.

Scrap prices seem to be edging upward in some sections of the nation. Pig iron shipments are proceeding this week on the same basis as prevailed prior to the recent announcement of the new control measure.

Being the center of the industry, CHICAGO hears much about the plight of the farm implement manufacturer. He is getting bars and sheets in at least a satisfactory degree. But practically none of his plate and shape requirements are being handled. No priority ratings have been issued—and wild rumors of ratings from A-3 to none at all are heard. Meanwhile virtually every manufacturer is exerting as much pressure as possible to get steel with only mixed results.

July business in that district was generally off, some producers falling 35 per cent due to civilian buyers realizing the futility of ordering steel without ratings; however, an important bar producer increased his July's bookings by a third over June, mostly attributable to implement orders. One forger there announces he will take no civilian orders for a year. Number of civilian firms reducing operations for lack of material grows each week. Structural fabricators are levelling off temporarily, probably a short breathing spell in anticipation of a new flood of defense orders shortly expected.

A slight decline in bookings, compared to volume a month ago, is reported at BIRMINGHAM. This decline is attributed to a further ex-

tension on deliveries and to increased resistance by producers against orders not directly needed for defense. At least one producer in that district is having difficulty in meeting a growing demand for nails, occasioned both by construction of defense projects and by private building.

Priority orders continue to pour in from consumers in the ST. LOUIS district, all more or less confusing to the mills. Frantic efforts are being made to place orders for 1942, but mills that are taking them are promising nothing as to deliveries.

Inquiries to fabricators for non-defense projects show a falling-off at SAN FRANCISCO. Fabricators attribute this to lengthening delivery dates.

Iron Ore

... July shipments touch new peak at 11,390,488 tons

Vessel shipments of Lake Superior iron ore reached a new peak in July at 11,390,488 gross tons, including 59,479 tons of Canadian ore. Cumulative total for the season to Aug. 1 was 40,216,408 gross tons, well above any other season in history. The monthly figures are supplied by the Lake Superior Iron Ore Association, Cleveland.

Eleven cargos were gained by loading Canadian ships during July. It was the fourth consecutive month that new monthly records have been set in the lakes ore movement.

OPM is contemplating the building of an emergency fleet of ore ships for the Great Lakes, it was disclosed at Washington last week. While the fleet is able to keep abreast of current requirements, OPM's recent recommendation that pig iron capacity be greatly increased would necessitate construction of more vessels. Sixteen Great Lakes shipbuilding companies with a total of 36 ways hold contracts at the present time for 115 vessels but comparatively few new ore ships are on order. Most of the vessels scheduled to come from the Great Lakes shipyards are small craft for the Navy.

Semi-Finished Steel

... Million tons for Britain to create still tighter situation

Blooming and slabbing mills are being taxed far beyond so-called rated capacity and the problem of equitably distributing available semi-finished supplies is becoming more complex each week. The definite probability that Great Britain will take at least a million tons of semi-finished material in the final quarter of this year is expected to tighten the situation even more than it is now. A substantial pick up in munition steel requirements, and an increase in plate demand for ships and car building plants, is expected to earmark an increasingly larger amount of semi-finished capacity.

For fourth quarter delivery the industry faces the possibility of being called on for new large semi-finished tonnages to Great Britain, reports CLEVELAND.

Rod shipments which show a tremendous gain at CLEVELAND to date this year over 1940 continue high but are not equal to the unprecedented demand.

Merchant Bars

... Large tonnages for munition plants overhang markets

Additional inquiries for munition steel are making their appearance and some PITTSBURGH makers say that tonnages upwards of 150,000 tons are in the offing. This is believed to be only the beginning, since when munition plants begin full operation, totals approximating as much as three to four million tons have been mentioned by government sources. Such orders, however, will be shipped over an extended period. Nevertheless, defense requirements, both direct and indirect, are taking from 75 to 80 per cent of bar production.

Demand at CLEVELAND and YOUNGSTOWN remains above production on all types of bars from common reinforcing up to quality electric furnace grades. Mills are operating just as many turns per week as raw steel supplies will permit, but due to the tighter situation on raw steel brought about by increased exports, production actually is slightly lower than it was earlier

OPACS Starts Study of Steel Company Profits

Washington

• • • An exhaustive questionnaire through which OPACS hopes to ascertain the impact on steel company's earnings of wage and material cost increases was being prepared this week for wide distribution in the steel industry. The questionnaire is understood to call for second quarter financial returns by products and overall returns. OPACS also seeks through the inquiry to learn what steel companies, if any, can absorb increased costs at price levels frozen on April 17.

Officials recalled that the agreement for "voluntary" price freezing carried a clause for inequity so that any hard pressed companies could get upward price adjustments.

this summer. Exceptionally heavy inquiry for electric furnace bars arose last week from airplane parts makers. The reinforcing bar market has become tighter and tighter from the standpoint of supply and demand.

Bar production is lessening in CHICAGO since ingot allotments for bar mills are forcefully diverted elsewhere. Farm implement makers are getting bars in quantities but this is actually the only steel item they can get with comparative freedom. Alloy orders are slightly off non-defense buyers now aware that orders without priorities are useless.

Structural Steel

... Awards are 26,700 tons, double a week ago

Fabricated structural steel awards this week of 26,700 tons are almost double a week ago. Outstanding lettings are 18,400 tons in Oregon and Washington for transmission line towers for the Bonneville Administration; 1230 tons in Brooklyn for a stockhouse for the F. & M. Schaefer Brewing Co., and 1100 tons for a boat storage building, boat trucks and other material for the Navy Department at San Diego, Cal. New structural steel projects jumped to 37,000 tons from 15,700 tons last week.

Reinforcing Steel

... War Department Building to take 22,000 tons

Reinforcing steel awards this week are in good volume at 25,250 tons. Lettings of size include 9000 tons at East Alton, Ill., for the Western Cartridge Co. plant; 4600 tons for dry docks Nos. 5 and 6 at Brooklyn Navy Yard, and 3175 tons at Kendaia, N. Y., for the Seneca ordnance depot. New reinforcing steel projects of 39,475 tons are swelled by 22,000 tons for a War Department office building in Washington.

Tin Plate

... Cold mill operations continue above rated capacity

Little or no change is apparent in tin plate activity and practically all tin plate production is looked upon as a definite defense item. Cold reduction mill operations continue at somewhat above rated capacity.

Plates

... Armored equipment makers press for delivery

At CLEVELAND market highlights include production of plates for pontoons for the Navy by two mills, increased inquiry from manufacturers of large storage tanks which are needed for defense manufacturing projects and mounting pressure from makers of armored equipment for the United States and British military forces.

EASTERN PENNSYLVANIA plate mills, all booked to capacity as in other districts, will consider only priority orders, making no delivery promises unless the priorities are high. In order to avoid the necessity of taking a plate order that was not desirable, one mill quoted for the tonnage needed, basing it on the Pittsburgh rate of \$2.42 for an eastern delivery instead of basing it from Claymont, at \$2.12½.

Considerable difficulty has been encountered by one plate mill in this area in obtaining ferro-silicon, used as ladle and mold additions to kill steel. Priorities have to be secured from Washington to get this material, and only sufficient for the order on hand may be obtained.

Pig Iron

... Priority control drives consumers to seek higher ratings

Pig iron producers expect a mad scramble on the part of pig iron consumers to obtain material prior to Sept. 1, when no shipments may be made to any customer unless such shipments have been approved by Washington authorities or unless special provisions have been made by Washington.

Early this week pig iron offices were flooded with phone calls and telegrams asking for details on the latest full priority order covering pig iron. Summed up briefly, the order apparently means that no pig iron will be shipped to customers unless it is required for defense or essential civilian uses. While all defense orders will be given an A-10 preference rating, it is expected that a great number of customers will attempt to obtain higher ratings.

Details of OPM order establishing full priority control over pig iron on page 103C.

If the experience in the steel industry is any criterion, pig iron customers with an A-10 preference rating will undoubtedly find themselves very far down the list with regard to delivery. This is all the more true, it is said, because there is a temporary shortage of pig iron which, according to the OPM, will amount to more than 5,000,000 tons in 1941.

For a short time at least pig iron makers envision considerable confusion and delay because of the necessity for furnishing, on the 15th of each month, a complete shipping schedule for the following month. It is assumed the first such shipment schedule must be supplied to the director of priorities by Aug. 15. Many customers by that time will not have been able to obtain definite preference ratings, hence there may be some delay in Washington in the release and approval of the initial shipping schedules to be submitted. It is anticipated that pig iron consumers will, during the balance of this month, frantically attempt to have assigned to them specific priority ratings.

Steel companies and merchant furnaces, for the most part, will have little difficulty supplying Washington with shipping sched-

ules since many companies have already made out these lists covering the balance of the year.

Shipments this week from Ohio merchant stacks were proceeding unchanged by the newly announced control measure, reports CLEVELAND. The new setup covers orders received since Aug. 1 and is phrased long the same lines that sellers and consumers had expected. While all defense work hitherto unassigned a priority will henceforth automatically rate A-10, or if rated lower than A-10 will be moved up to A-10, in practice ratings lower than A-3 have been unusual, reports CLEVELAND. The new measure provides a reserve for emergency use by the government and each producer will withhold a stated amount beginning in September, the amount being liable to variation from month to month. Foundries are prevented from selling pig iron to each other. All doubtful questions about priority will be referred to the Division of Priorities.

Merchant pig iron gets tighter in CHICAGO. One steel mill producer is cutting the outside sale of northern iron by 50 per cent and of southern by 20 per cent. Others have cut off outside sales almost entirely. The allocation order, at first blush, is not considered likely to change the situation substantially. CHICAGO's production was featured this week with the blowing in of Carnegie-Illinois' 23rd blast furnace, making 100 per cent operation in the firm's Gary and South Works plants for the first time in history. Simultaneously, the entire district showed all furnaces in blast at all mills. New blast furnace to be installed by the Inland Steel Co. will not be ready for 10 months to a year.

Pig iron merchants in the PHILADELPHIA area are generally of the opinion that the OPM priority order will hit foundries the hardest, and within a short time cut off entirely the iron supply to those foundries that haven't been doing defense work. Consumers or merchants expect to receive official forms from OPM this week.

The pool plan is looked upon with apprehension in some quarters, it being pointed out that allocations will really have to be made twice, once for the available supply for direct distribution and once for the pool supply. As the available sup-

ply now is hardly sufficient, it is believed the pool will be exhausted quickly.

Despite the Federal order instituting priorities on Aug. 1, by Aug. 4 the NEW YORK OPM office still had no forms for pig iron buyers to fill out prior to obtaining a rating. For the time being, urgent orders were to be referred to the OPM office for oral rating. Demand continued to be met only in part, and the stringency was reflected in "shopping around" by buyers unable to obtain their requirements from usual sources.

As the government placed pig iron under full priority control, the iron situation at BIRMINGHAM had probably reached the most critical stage in that district's iron-making history. Surplus stocks of leading foundries had become practically exhausted and pipe shop supplies were in the same condition, a condition aggravated by scarcity of suitable scrap grades.

Sheets and Strip

... Lack of semi-finished hampers hot mill operations

Semi-finished steel shortages have confined continuous hot mill operations at one CLEVELAND plant to five days per week recently. Much skelp has been rolled intermittently at the mill, up to the limit of shearing capacity, for down-state Ohio electric weld pipe mills. Cold mill operations have been as low as three days per week recently.

Consumers with non-defense business are finding their orders either being turned down or PITTSBURGH makers are giving promises so far in the future that there is little or no use of commitments being made. High speed sheet mills in some instances are having more than 50 per cent of their capacity utilized for plate production. When tin plate demands are added to this, the amount left over for bona fide sheet production shows considerable curtailment.

With conversion to plates plus diversion of semi-finished sheet allocations, production in CHICAGO is conservatively estimated now at around 60 per cent of normal sheet manufacture. However, this is one item that the hard pressed farm implement makers are still getting, though not as easily as in bars.

Tubular Goods

... Casing orders this week exceptionally heavy

The large crude oil line to utilize 20 and 24 in. pipe is still pending but definite action is expected soon. PITTSBURGH pipe makers see an unending demand for standard pipe, a large share of which is going into direct government projects. Tubular order books disclose an increasingly larger amount of material tagged with defense ratings. Casing orders have been exceptionally heavy in the past two months but deliveries on this business will have to give way when defense requirements are encountered.

The CHICAGO mills—Inland Steel Co. and Carnegie-Illinois Steel Corp.—were among recipients of the 11,000 tons each allocation on the 405 mile pipe line to be built by A. O. Smith for Panhandle Eastern Co. and Michigan Gas Transmission Co. This received an A-2 priority, and further burdens production schedules. Jobbers' stocks of pipe are rated in good condition, though sales continue at lofty levels. Reduced but steady shipments of galvanized pipe continue to reach jobbers.

Tighter control over zinc by the government has become effective during the past week, creating an even more intense problem for pipe consumers and producers, reports CLEVELAND.

Wire Products

... New tonnage still running ahead of production

New tonnage shows no slackening at CLEVELAND. Lighter order volume from the peace-time trade is more than offset by heavy defense purchases. Shipments of all departments to date this year are better than 70 per cent ahead of tonnage delivered in the comparable part of 1940, despite difficulty obtaining increased raw material. Greatest single gain is shown by rod shipments to outside users. Priority requirements on copper wire continue very strict.

Wire specifications continue to roll in at PITTSBURGH in excess of actual production and some orders are either being turned down or are

having somewhat extended delivery promises placed upon them.

Chicago

One CHICAGO mill is filling present orders, taking no new ones at all since it is running rods at only 70 per cent of capacity and converting remainder to production of bars. Jobbers stocks are reported unbalanced, and manufacturers inventories continue at a low level.

Ingot Production

... Rate advances half point to 99.5 per cent

Steel ingot production this week will be at 99.5 per cent of capacity, according to THE IRON AGE compilation, a gain of a half point over a week ago, but one point below the year's high of 100.5 per cent reached in the week of June 24. The small gain was due to a one-point advance at Pittsburgh, the largest producing area, to 101 per cent, a similar gain in the Wheeling-Weirton district to 91 per cent and a rebound in the Buffalo rate to 104.5 per cent from the dip to 88 per cent a week ago caused by an accident at the Wickwire-Spencer plant. Detroit also reported an increase. Chicago, the Valleys and Cleveland showed small losses for the week.

The Portsmouth plant of Wheeling steel is reported still operating on a curtailed basis due to lack of scrap to permit the company to keep all eight furnaces hot. By rushing repairs, Wickwire-Spencer was able to light three of the four furnaces shut down due to the accident by last Saturday. The fourth is expected to be lighted this week some time.

Railroad Buying

... Orders total 2022 freight cars and 38 locomotives

A slight moderation in railroad rolling stock orders, which totaled 38 locomotives and approximately 2022 freight cars, was indicated in the past week. This was not far below the 50 locomotives and 2300 freight cars of the previous week, and indicated sustained strong demand by the railroads.

Louisville & Nashville ordered 14 steam locomotives of the 2-8-4

type from Baldwin; Terminal Railroad Association bought 10 diesel-electric locomotives, five each from American Locomotive and Baldwin; the Sorocabana Railway of Brazil 10 electric locomotives of the 2-6-6-2 type from Westinghouse Electric & Manufacturing.

Smaller locomotive orders included: one 58-ton fireless locomotive ordered by Crucible from Heisler Locomotive Works; six steam locomotives of the 4-8-4 type by Richmond, Fredericksburg & Potomac from Baldwin; five 1000-hp. diesel-electric switching locomotives from Baldwin for the St. Louis-San Francisco; and two 1000-hp. diesel-electric locomotives ordered by New York, Susquehanna & Western from American Locomotive.

Freight car buying was featured by Chicago & Northwestern's completion of arrangement for over 2000 box and ore cars at a cost of more than \$5,000,000 from American Car & Foundry, Pullman-Standard Car Mfg., General American Transportation, and Bethlehem Steel. About 500 of the cars will be taken by the Chicago, St. Paul, Minneapolis & Omaha.

Bethlehem Steel Co. will build 10 cabooses for the Denver & Rio Grande Western; and Lehigh Valley has ordered 12 cabooses from the company's own shops. An order of six more sleeping cars from the Pullman-Standard Car Manufacturing Company, brings the Pullman Company's total awards for these cars to 176 thus far in 1941.

Southern Pacific Lines has placed a contract with the Tennessee Coal, Iron and Railroad Co. calling for 6226 tons of rail to be rolled at Ensley Rail Mill.

OPM Appoints Alex Taub

Washington

• • • Alex Taub, American designer and development engineer for a major aircraft company in England, has been named chief technical consultant of OPM's automotive branch, where he is expected to play an important role in the technical aspects of the automobile industry's shift from peacetime to defense production during which it may assume responsibility for \$6,000,000,000 in defense orders.

Machine Tools

... SALES, INQUIRIES AND MARKET NEWS

May Commandeer Machine Tools

Cleveland

••• While broad power to commandeer machine tools is being sought by certain government departments, it is the opinion of certain well informed leaders of the industry here the power would not be widely used. Uprooting machine tools involves training new men and fitting the machine into new production, which involves a long chain of events requiring time, money and priorities.

According to latest reports, several companies expected to participate in the big bomber program scheduled for completion late next year are slow in passing out orders. A number of participants broke out with heavy buying in early July.

A large shipment of machinery for Russia cleared from the West Coast last week and it is understood the cargo contained quite a few machine tools ordered long ago.

Capacity Being Enlarged

Cincinnati

••• Further expansion of district machinery capacity within this month is expected as new buildings are completed. In fact, one large manufacturer whose addition is about ready to open is considering ways and means of enlarging demand, especially for production line tools, to insure full operation of its enlarged capacity. Elsewhere in the district, the expansion will only tend to relieve the already overworked factories and bring a closer rela-

tion between orders and deliveries. Many manufacturers report that fresh bookings cannot take earlier shipment than next June or July but most report that late spring is the earliest. The potential business is still very large and demand continues to be exceedingly brisk.

Some Deliveries Quite Prompt

Chicago

••• Deliveries are spotty, long range promises still holding in some cases, while surprisingly prompt shipments are being made on the smaller, popular standard sizes. With new defense plants coming into this area almost daily, the flow of inquiries mounts higher. Fortunately, manufacturers have reached the point where their production is in high gear and prospects of new business are accepted calmly.

Following a report in these columns last week that production might begin about Nov. 1, at the Buick aircraft engine plant here, Harlow Curtice, president of Buick, announced that the plant would be finished as early as Sept. 1, which would advance the production schedule. However, there are more than 1700 machine tools to be installed in the plant and informed sources still think Nov. 1 would be cause for high rejoicing if attained. Machinery is being installed now. Studebaker will have installation under way this week at its new South Bend engine plant.

Used machinery sales follow a steady but reduced course since stocks of good used equipment are very low. Many big defense manufacturers continue to send men around regularly to inspect floor stocks to pick up equipment where new deliveries are delayed. About 4800 used machine sales were cleared through OPACS in a recent six weeks' period, indicating the volume still held by dealers. Since the ceiling prices went into effect, the trade has maintained a splendid record of full cooperation with the regulations.

LEE

Quality Springs

ALL SHAPES • ALL SIZES • ALL MATERIALS

LEE SPRING COMPANY, Inc.

30 MAIN STREET BROOKLYN, N.Y.

LEE-BUILT
TRADE
MARK
SPRINGS

Non-Ferrous Metals

... MARKET ACTIVITIES AND PRICE TRENDS

OPM Announces 100% Copper Control; Tin Prices To Be Fixed

... Full OPM priority control of the copper industry, an OPACS meeting with tin exporters and dealers, the meeting to allocate lead from Metals Reserve Co. for August, announcement of the August zinc pool, and the reopening of a zinc mine at Gilman, Colo., summarize major happenings in this week's non-ferrous industries.

Priorities Director Stettinius signed the control order for copper last Saturday, requiring that after August 6, no deliveries of refined copper shall be made except on specific directions of the priorities director. The "emergency pool" on copper, made unnecessary by the order, has been discontinued, and a preference rating of A-10 has been assigned to all deliveries for defense orders which have not already received a higher rating.

While official announcement has not yet been made, OPACS representatives indicated Tuesday that a price schedule for tin may be forthcoming within a week. This report followed a meeting on Monday of tin dealers, exporters and brokers during which OPACS sought information on tin shipping rates and quality differentials. The resistance of tin prices to drop to the 50c. level suggested by OPACS is believed to have inspired the expected price ceiling.

The most important feature in the lead market was the meeting held Monday in Washington, at which August allocations of the Metal Reserve Co.'s lead stock were to be made. Results of this meeting have not yet been announced. Smelters and refiners lead stocks dropped from 105,197 tons in May to 100,548 tons in June.

The August zinc pool was set for 27 per cent of the June zinc production, which will result in about 19,000 tons being set aside for defense emergencies.

Prices continued steady last week, tin being the only commodity to show any change. Copper prices held at 12c. a lb., Connecticut Val-

ley, quoted by producers, and 12½c., quoted by custom smelters. Lead prices were 5.70c. a lb., St. Louis, and 5.85c., New York, while zinc prices remained at 7.25c. a lb., East St. Louis, and 7.60c., New York. Tin prices eased from 53c. to 51.75c. during the week.

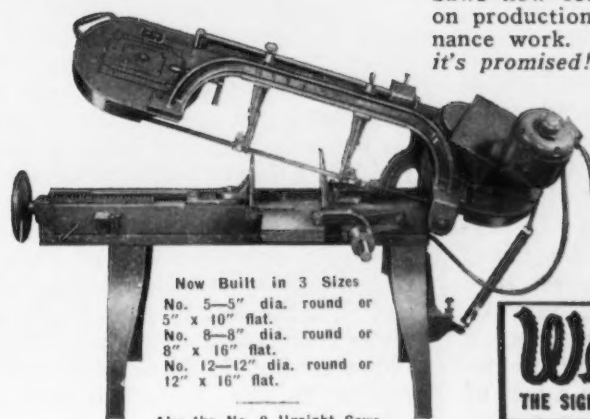
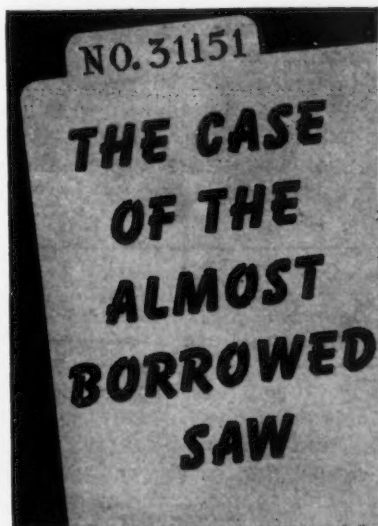
Average prices of the major non-ferrous metals in July, based on quotations appearing in THE IRON AGE, were as follows:

	Cents per Lb.
Electro copper, Conn. Valley.....	12.00
Lake copper, East., delivery.....	12.00
Straits tin, spot, New York.....	53.408
Zinc, East St. Louis.....	7.25
Zinc, New York.....	7.65
Lead, St. Louis.....	5.70
Lead, New York.....	5.85

(Current non-ferrous prices appear on page 123.)

\$105½ Million Authorized For 3 Army Ordnance Plants

... Crab Orchard Lake, Ill., Flora, Miss., and Choteau, Okla., have been selected by the War Department as sites for three new ordnance plants. The Illinois project, to be known as the Illinois Ordnance Plant, will employ more than 6000 persons and will cost an estimated \$40,000,000. The Mississippi Ordnance Plant, for which \$14,500,000 has been authorized, will be used for bag loading and will employ, when finished, 1900 workers, many of them women. Five thousand persons will be employed in the Choteau plant, for which \$51,000,000 has been authorized, and which will manufacture smokeless powder.



New Built in 3 Sizes
No. 5—5" dia. round or
5" x 10" flat.
No. 8—8" dia. round or
8" x 16" flat.
No. 12—12" dia. round or
12" x 16" flat.

Also the No. 9 Upright Saws

A VITAL metal cutting job came up and no saws were available. A few days before a new Wells had been ordered, but dubious of prompt delivery, the company arranged to borrow a Wells Saw from a nearby manufacturer, to be trucked between plants night and morning so each could use it.

Then this trouble, delay and confusion never materialized, for the new saw arrived *on time!**

There's no need to wait weeks for delivery on saws. Fast, portable, dependable Wells Saws can still be delivered in an amazingly short time—thanks to Wells' new factory and production facilities. Order your Wells Saws now for low cost metal cutting on production jobs, odd jobs, maintenance work. You'll get delivery when it's promised! Write today.

*Actual case record on file.

**WELLS
MFG. CORP.**
THREE RIVERS, MICH.

Wells SAWS
THE SIGN OF SERVICE

Scrap

. . . MARKET ACTIVITIES AND QUOTATION TRENDS

Scrap Shortage Not Due to Exporting, Barringer Declares

Washington

• • • Refusing to accept the responsibility for any shortage of iron and steel scrap that may cause the shutdown of steel mills and foundries, the Institute of Scrap Iron and Steel, Inc., through its executive secretary, Edwin C. Barringer, refutes allegations made by heads of steel companies in their quarterly reports and cites efforts on the part of the industry over the past six months to prevent such shutdowns.

"The steel mills are not telling the public the whole story about scrap," Mr. Barringer stated. "The mills have failed to indicate the rapidly-increasing demand together with the fact that throughout the country they are not only engaged in record-breaking defense work but are also manufacturing the usual consumer goods.

"When scrap prices were abnormally low the mills refused to purchase it, which resulted in the exportation of scrap. In slack periods the mills expect the scrap dealers to be their bankers and hold the scrap for them."

All scrap that was exported to Japan prior to October, 1940, was shipped because the State Department considered that country a friendly nation and did not want self-imposed embargoes, just as was done with oil, cotton, and semi-finished and cold finished steel, Mr. Barringer pointed out.

The mills have recently become engaged in direct dealing, thus circumventing the normal channels of trade and driving many men out of the scrap business, he charged. "The ranks of the scrap collectors of the country who have been the greatest force for conservation in the country have rapidly dwindled because they could not make a livelihood," Mr. Barringer declared. "Every scrap collector forced into other employment has resulted in a loss of at least one ton of scrap a day,

which in the course of a year would mean greatly reduced collections running into millions of tons.

"A considerable tonnage of scrap could have moved to the mills and foundries had government agencies accepted experience and practical recommendations made by the Institute of Scrap Iron and Steel and by a scrap and steel mill advisory committee which was set up to help the government meet this crisis.

"Last January the Institute advocated bringing scrap in from remote areas, the use of WPA in lifting the rails of abandoned street car lines, the demolition of abandoned structures, and the collection of dormant scrap in various parts of the country.

"In April, the Institute recommended an auto wrecking campaign which would have secured additional millions of tons of scrap this year. In April, the Institute recommended a national salvage drive.

"It should also be remembered that the iron and steel scrap which was exported from this country in the past five years came in the main from remote areas—the very areas, in fact, from which prac-

Details of OPACS request for investigation of scrap trade and statement of the Institute of Scrap Iron and Steel on page 104D. Other scrap news on page 79.

tically no scrap is being drawn at present owing to the high freight rates and failure of OPACS to recognize the existence of such scrap and to make the necessary allowance in the price structure.

"Our industry has not asked and does not now ask an overall increase in price. We do, however, charge the price regulatory body with failure to apprise the American people that the price of \$20 for No. 1 heavy melting steel at Pittsburgh does not take into consideration the cost of freight, the cost of preparation of the material, or the cost of gathering it, and that the No. 1 heavy melting scrap referred to constitutes only 10 per cent of the total, with other grades selling at much lower prices.

OPACS Move Seen Intended To Pass Buck to Scrap Trade

• • • While the significance of the OPACS action asking for an investigation of alleged monopolistic practices of the iron and steel scrap trade was not immediately apparent, most observers were inclined to believe that grounds were being laid to pass the buck to the scrap trade for any steel production lost due to lack of scrap supplies.

It was pointed out that the move represented a peculiar roundabout method of enforcing OPACS price ceilings and certainly will not be a constructive force in the midst of efforts to increase supplies at this critical point.

The question of the adequacy of the OPACS price fixing efforts is shrouded in considerable misunderstanding, but it is apparent that the maximums and other regulations are strictly the work of OPACS and the price division's inclination to ignore the recommendations of the scrap industry places the responsibility for either the success or failure of the price fixing effort squarely up to OPACS, regardless of attempts to pass the buck.

Such facts as that the scrap industry today is shipping the largest tonnage in its history at prices below those prevailing at any previous time of full capacity ingot operations is apparently ignored. The solution to the problem rests not on anti-trust action, but rather on providing OPACS directly with enforcement teeth and an effort on the part of OPACS to appreciate the sincerity of scrap trade leaders and endeavor to cooperate with them in establishing regulations that fit the characteristics of the scrap industry.

Meanwhile district reports continue to stress the serious deficiencies of the scrap supplies. American Rolling Mill Co. plans to expand its drive for community collection of scrap steel into an all-out effort involving use of radio and newspapers and house-to-house collection. The company is also extending its efforts to Ashland.

Maximum Iron and Steel Scrap Prices

As Revised by OPACS to June 25, 1941

SCHEDULE A

(Basing point prices from which shipping point prices and consumers' delivered prices are to be computed—Dollars per gross ton)

Basing Points →	Pittsburgh, Pa. Johnstown, Pa. Warren, W. Va. Steubenville, O. Youngstown, O. Warren, O. Sharon, Pa. Canton, O.	Chicago	Kokomo, Ind.	Bethlehem, Pa. Claymont, Del. Coatesville, Pa. Phoenixville, Pa. Harrisburg	Sparrows Point, Md.	Buffalo	Cleveland	Toledo, Ohio	Portsmouth, Ohio Middletown, Ohio Ashland, Ky.	St. Louis	Detroit	Duluth	Birmingham, Ala.	Chattanooga, Tenn.	Radford, Va.	Worcester, Mass. Bridgeport, Conn. Phillipsdale, R. I.	Los Angeles San Francisco Seattle	Minneapolis, Minn.
▼ GRADES																		
No. 1 heavy melting	20.00	18.75	18.25	18.25	18.75	18.75	19.25	19.50	19.50	17.50	17.85	18.00	17.00	18.00	17.00	17.00	14.50	16.50
No. 1 hydraulic compressed black sheet	20.00	18.75	18.25	18.25	18.75	18.75	19.25	19.50	19.50	17.50	17.85	18.00	17.00	18.00	17.00	17.00	14.50	16.50
No. 2 heavy melting	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	18.50	16.50	16.85	17.00	16.00	17.00	16.00	16.00	13.50	15.50
Dealers' No. 1 bundles	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	18.50	16.50	16.85	17.00	16.00	17.00	16.00	16.00	13.50	15.50
Dealers' No. 2 bundles	18.00	16.75	16.25	16.25	16.75	16.75	17.25	17.50	17.50	15.50	15.85	16.00	15.00	16.00	15.00	15.00	12.50	14.50
Mixed borings and turnings	15.25	14.00	14.25	13.50	14.00	14.00	14.50	14.75	14.75	12.75	13.10	12.25	12.25	12.25	12.25	12.25	9.75	11.75
Machine shop turnings	15.50	14.25	14.50	13.75	14.25	14.25	14.75	15.00	15.00	13.00	13.35	15.50	15.00	15.00	15.00	15.00	10.00	12.00
Shoveling turnings	16.50	15.25	15.50	14.75	15.25	15.25	15.75	16.00	16.00	14.00	14.35	16.50	16.50	16.50	16.50	16.50	11.00	13.00
No. 1 busheling	19.50	18.25	17.75	17.75	18.25	18.25	18.75	19.00	19.00	17.00	17.35	17.50	16.50	17.50	16.50	16.50	14.00	16.00
No. 2 busheling	15.50	14.25	13.75	13.75	14.25	14.25	14.75	15.00	15.00	13.00	13.35	13.50	12.50	13.50	12.50	12.50	10.00	12.00
Cast iron borings	15.75	14.50	14.00	14.00	14.50	14.50	15.00	15.25	15.25	13.25	13.60	13.75	12.75	13.75	12.75	12.75	10.25	12.25
Uncut structural and plate scrap	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	18.50	16.50	16.85	17.00	16.00	17.00	16.00	16.00	13.50	15.50
No. 1 cupola	21.00	20.00	20.00	22.50	23.00	22.00	20.00	22.00	21.00	20.00	20.35	18.00	20.00	20.50	21.00	22.00	18.00	20.00
Heavy breakable cast	19.50	18.50	18.50	21.00	21.50	21.00	18.50	20.50	19.50	18.50	18.85	16.50	18.50	18.50	18.50	20.50	17.00	19.00
Stove plate	19.00	17.00	16.00	18.00	18.50	18.00	19.00	18.00	15.60	17.50	17.00	14.10	17.00	17.50	18.00	14.00	14.00	11.25
Low phos. billet and bloom crops	25.00	23.75	23.75	23.25	23.75	23.75	24.25	24.50	23.50	22.50	22.85	23.00	22.00	23.00	22.00	23.00	19.50	21.50
Low phos. bar crops and smaller	23.00	21.75	21.75	21.25	21.75	21.75	22.25	22.50	21.50	20.50	20.85	21.00	20.00	21.00	20.00	21.00	18.00	20.00
Low phos. punchings and plate scrap	23.00	21.75	21.75	21.25	21.75	21.75	22.25	22.50	21.50	20.50	20.85	21.00	20.00	21.00	20.00	21.00	18.00	20.00
Machinery cast, cupola size	22.00	21.00	21.00	23.50	24.00	23.50	21.00	23.00	22.00	21.00	21.35	19.00	21.00	21.50	22.00	23.00	19.00	21.00
No. 1 mach. cast, drop-broken, 150 lbs. and under	22.50	21.50	21.50	24.00	24.50	24.00	21.50	23.50	22.50	21.50	21.85	19.50	21.50	22.00	22.50	23.50	19.50	21.50
Clean auto cast	22.50	21.50	21.50	24.00	24.50	24.00	21.50	23.50	22.50	21.50	21.85	19.50	21.50	22.00	22.50	23.50	19.50	21.50
Punchings and plate scrap	22.00	20.75	20.75	20.25	20.75	20.75	21.25	21.50	20.50	19.50	19.85	20.00	19.00	20.00	19.00	20.00	18.00	20.00
Punchings and plate scrap	21.00	19.75	19.75	19.25	19.75	19.75	20.25	20.50	19.50	18.50	18.85	19.00	18.00	19.00	18.00	19.00	17.00	19.00
Heavy axle and forge turnings	19.50	18.25	18.25	17.75	18.25	18.25	18.75	19.00	18.00	17.00	17.35	17.50	16.50	17.50	16.50	17.50	14.00	16.00
Medium heavy electric furnace turnings	18.00	16.75	16.75	16.25	16.75	16.75	17.25	17.50	16.50	15.50	15.85	16.00	15.00	16.00	15.00	16.00	12.50	14.50

¹ This grade is $\frac{3}{4}$ -in. and heavier, cut 12 in. and under.

² May include clean agricultural cast.

³ Under $\frac{3}{4}$ to $\frac{1}{4}$ -in., cut 12 in. and under.

⁴ Under $\frac{1}{4}$ -in. to No. 12 gage, cut 12 in. and under.

⁵ Youngstown, Warren, Sharon and Canton are not basing points on this grade.

⁶ Portsmouth, Ohio, price for this grade is \$15.25. Ashland, Ky., is not a basing point for this item.

SCHEDULE B Railroad Scrap

(Delivered Consumers' Plants Located on Line of Railroad Originating Scrap—Per Gross Ton)

Basing Points →	Pittsburgh, Pa. Sharon, Pa. Wheeling, W. Va. Steubenville, O. Youngstown, O. Canton, O.	Chicago	Kokomo, Ind.	Philadelphia	Wilmington, Del.	Sparrows Point	Cleveland	Buffalo	Portsmouth, O. Middletown, O. Ashland, Ky.	St. Louis	Kansas City	Detroit	Duluth	Birmingham, Ala.	Los Angeles San Francisco Seattle	Minneapolis, Minn.
▼ GRADES																
No. 1 heavy melting	\$21.00	\$19.75	\$19.25	\$19.75	\$19.75	\$19.75	\$20.50	\$20.25	\$20.50	\$18.50	\$17.00	\$18.85	\$19.00	\$18.00	\$15.50	\$17.50
Scrap rails	22.00	20.75	20.25	20.75	20.75	20.75	21.50	21.25	21.50	19.50	18.00	19.85	20.00	19.00	16.50	18.50
Re-rolling rails	23.50	22.25	21.75	22.25	22.25	22.25	23.00	22.75	23.00	21.00	19.50	21.35	21.50	20.50	18.00	20.00
Scrap rails 3 ft. and under	24.00	22.75	22.25	22.75	22.75	22.75	23.50	23.25	23.50	21.50	20.00	21.85	22.00	21.00	18.50	20.50
Scrap rails 2 ft. and under	24.25	23.00	22.50	23.00	23.00	23.00	23.75	23.50	23.75	21.75	20.25	22.10	22.25	21.25	18.75	20.75
Scrap rails 18 in. and under	24.50	23.25	22.75	23.25	23.25	23.25	24.00	23.75	24.00	22.00	20.50	22.35	22.50	21.50	19.00	21.00

* Relaying quality \$5 higher.

Where the railroad originator of the scrap operates in two or more of the basing points named in Schedule B, the highest of the maximum prices established for such basing points shall be the maximum price of the scrap delivered to a consumer's plant at any point on the railroad's line, except that Chicago consumers of scrap originating from railroads operating in Chicago are permitted to pay as much as 84c. a gross ton in switching charges above the maxima.

Explanatory Notes

(A basing point includes its switching district.)

MAXIMUM PRICE at which any grade of scrap may be delivered to consumer's plant, wherever located, is the shipping point price, plus actual transportation from the shipping point to consumer. Where shipment is by water, actual handling charges at the dock of not more than 75c. a gross ton may be included as part of transportation charges. In no case may this maximum price exceed by more than \$1 prices in Schedule A for the basing point nearest the consumer.

COMPUTING SHIPPING POINT PRICE: A shipping point is the point from which scrap is to be shipped to consumer and is calculated by subtracting the lowest established charge for transporting scrap from the shipping point to the nearest basing point. The following are exceptions: The shipping point price at any shipping point in New England, of those grades for which no prices are listed at the basing points established for New England, shall be the Johnstown basing point price, minus all-rail transportation costs from the New England shipping point to Johnstown. How-

ever, the shipping point price at any shipping point in New England of those grades of scrap for which prices are listed at the basing points in New England shall be computed from those New England basing point prices.

REMOTE SCRAP: Material located beyond the zone from which the railroad freight rate to Pittsburgh is \$11.20 is called remote scrap. Consumers desiring to purchase such scrap, but unable to do so without exceeding the ceiling prices, may make application to OPACS for permission to absorb the excess freight charges.

UNPREPARED SCRAP: Regardless of source, maximum price of unprepared scrap is \$2.50 less than maximum for corresponding grade of prepared scrap.

BILLET AND BLOOM CROPS: Where such material originates in the Pittsburgh basing point, it may be sold delivered to a consumer within or without the Pittsburgh point at the price given in Schedule A, plus not more than \$2.50 in transportation charges. Lowest established transportation charges will govern.

Construction Steel

...STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Lettings of 26,700 tons are almost double those of a week ago; new projects jump to 37,000 tons from 15,700 tons; plate awards only 800 tons.

AWARDS

NORTH ATLANTIC STATES

- 1230 Tons, Brooklyn, Schaefer Brewing Co., stockhouse, to American Bridge Co., Pittsburgh.
- 885 Tons, Niagara Falls, N. Y., buildings for National Carbon Co., to Bethlehem Steel Co., Bethlehem, Pa.
- 650 Tons, Hauto, Pa., boiler framing, to Lehigh Structural Steel Co., Allentown, Pa.
- 335 Tons, New Bedford, Mass., Fort Rodman roof trusses and beams, to Bethlehem Steel Co., Bethlehem, Pa.
- 200 Tons, Richmond, Mass., State bridge R-6-3, to American Bridge Co., Pittsburgh.
- 100 Tons, Niagara Falls, N. Y., addition for Frontier Bronze Corp., to Ernst Iron Works, Buffalo.

THE SOUTH

- 830 Tons, Flora, Miss.; 650 tons for bag manufacturing plant, 180 tons for eight bag loading buildings for Mississippi Ordnance plant, to Southern Steel Works, Birmingham.
- 510 Tons, Claiborne, W. Va., furnace building for National Carbon Co., to Bethlehem Steel Co., Bethlehem, Pa.
- 468 Tons, El Reno, Okla., State highway bridge, to Capitol Steel & Iron Co., Oklahoma City.
- 372 Tons, Jacksonville, Fla., land plane hangar for Navy to Ingalls Iron Works Co., Birmingham.
- 234 Tons, Wyandotte, Okla., State highway bridge, to Capitol Steel & Iron Co., Oklahoma City.

CENTRAL STATES

- 385 Tons, Arapahoe, Neb., State highway bridge, to St. Joseph Structural Steel Co., St. Joseph, Mo.
- 252 Tons, Elkhorn, Neb., State highway bridge, to Omaha Steel Works, Omaha, Neb.
- 140 Tons, Cleveland, Evergreen exchange building for Ohio Bell Telephone Co., to Bethlehem Steel Co., Bethlehem, Pa.

WESTERN STATES

- 18,400 Tons, Bonneville, Ore., and Washington points, transmission line towers for Bonneville Administration (Invitation 2069), to American Bridge Co., Pittsburgh.
- 1100 Tons, San Diego, Cal., boat storage building, boat trucks, and steel roof materials for Navy (Specification 10,511), to Bethlehem Steel Co., San Francisco.

- 325 Tons, Friant, Cal., trash racks for Friant Dam (Specification 1510-D), to A. J. O'Leary & Son Co., Chicago.
- 190 Tons, Weber River, Wyo., bridge No. 981.01 over Weber River for Union Pacific Railroad Co., to American Bridge Co., Pittsburgh.

PACIFIC OCEAN

- 283 Tons, Midway Islands, additional buildings for U. S. submarine base, to Ingalls Iron Works Co., Pittsburgh plant.

PENDING STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

- 8000 Tons, Brooklyn, sub-assembly shop, Brooklyn Navy Yard.
- 1900 Tons, Rome, N. Y., Army depot supply building, unit No. 1.
- 1300 Tons, Belleville, N. J., building No. 3 for Defense Plant Corp.
- 1200 Tons, Tafford, Pa., three buildings for Westinghouse Electric & Mfg. Co.
- 800 Tons, Princeton, N. J., R.C.A. laboratory building; H. K. Ferguson Co., Cleveland, general contractor.
- 450 Tons, Fairfield, Me., State crossing.
- 425 Tons, Brooklyn, Navy transfer bridge dry-docks Nos. 5 and 6.
- 375 Tons, Philadelphia, two buildings for Charles Lenning Co.; Frank V. Warren Co., contractor, bids in.
- 300 Tons, Midvale, Pa., extension to casting plant; bids in.
- 225 Tons, Philadelphia, Quartermasters depot, underpasses, Wark & Co., contractors, bids in.
- 165 Tons, Camden, N. J., shipways U-3 and 4, contract No. 5 for New York Shipbuilding Corp.
- 160 Tons, Bridgeport, Conn., building for Remington Rand Co.
- 150 Tons, Mineola, N. Y., State bridge PSC-9778.
- 135 Tons, Chelsea, Mass., extension to main building, Naval Hospital.
- 100 Tons, Wilmington, Del., warehouse for Allied Kid Co.; bids in.

THE SOUTH

- 350 Tons, Gilbertsville, Ky., Kentucky Dam intake gates for TVA.

CENTRAL STATES

- 11,000 Tons, Wichita, Kan., mezzanine assembly building for Boeing Airplane Co.
- 3300 Tons, Ypsilanti, Mich., bomber plant hangar, for Defense Plant Corp.
- 2000 Tons, Burns City, Ind., inert storage buildings for Navy.
- 1600 Tons, Moraine City, Ohio, parts assembly building, Frigidaire division, General Motors Corp.
- 700 Tons, Detroit, gear and axle plant No. 6 for Chevrolet Motor division.
- 550 Tons, Indianapolis, State bridge, contract No. 2204.
- 400 Tons, Menominee, Ill., bridges, Sinsinawa River, for Illinois Central System.

- 325 Tons, Vandalia, Ohio, addition to propeller plant, Aeroproducts division, General Motors Corp.
- 225 Tons, Weldon Springs, Mo., concentrating plant for government.
- 200 Tons, Detroit, building addition for Vickers, Inc.
- 175 Tons, Towner, N. D., State underpass bridge No. 76.2.
- 140 Tons, Ladoga, Ind., State bridge, contract No. 2212.
- 120 Tons, Cleveland, North Noble Road subway for New York Central and St. Louis Railroad Co.
- 115 Tons, Stickney, Ill., miscellaneous for sewage treatment works, Chicago Sanitary district.

WESTERN STATES

- 110 Tons, Ogden, Utah, extension to engine house, stalls Nos. 12 and 20, for Union Pacific Railroad Co.

FABRICATED PLATES

AWARDS

- 800 Tons, 30-in. welded pipe, Wilmington, Del., for Frazer-Brace Engineering Co., for installation at Weldon Springs, Mo., to American Rolling Mills Co., Middletown, Ohio.

PENDING PROJECTS

- 2500 Tons, Pit River, Cal., penstocks for Pacific Gas & Electric Co.
- 500 Tons, 78-in. pipe, Philadelphia, for Philadelphia Electric Co.; bids in.

SHEET PILING

PENDING PROJECTS

- 515 Tons, Binghamton, N. Y., U. S. Engineers' flood control project.

Reinforcing Steel

Awards of 25,250 tons; 39,475 tons in new projects.

AWARDS

ATLANTIC STATES

- 4600 Tons, Brooklyn Navy Yard, drydocks Nos. 5 and 6, to Bethlehem Steel Co., Bethlehem, Pa.; Walsh Construction Co., contractor.
- 3175 Tons, Kendaia, N. Y., Seneca Ordnance depot, to Truscon Steel Co., Youngstown, through Poirier & McLane Corp. and John W. Harris Co.
- 954 Tons, Watertown, Mass., Watertown Arsenal for U. S. Army, to Truscon Steel Co., Youngstown.
- 500 Tons, Boston Navy Yard, power house and heating plant, to Joseph T. Ryerson & Son, Inc., Chicago; Stone & Webster Engineering Co., contractor.

Weekly Bookings of Construction Steel

Week Ended	Aug. 5, 1941	July 29, 1941	July 8, 1941	Aug. 6, 1940	Year to Date	
					1941	1940
Fabricated structural steel awards	26,700	14,200	32,000	20,045	910,910	544,025
Fabricated plate awards	800	1,250	4,865	6,090	94,465	89,775
Steel sheet piling awards	0	2,340	0	2,615	20,630	30,170
Reinforcing bar awards	22,250	22,500	6,135	7,925	395,005	269,110
Total Letting of Construction Steel	49,750	40,290	43,000	36,675	1,421,010	933,080

- 220 Tons, Dauphin County, Pa., highway project, R-1, to Bethlehem Co., Bethlehem, Pa.; Kaufman Construction Co., contractor.
- 110 Tons, Buffalo, addition for Hewitt Rubber Co., to Joseph T. Ryerson & Son, Inc., Buffalo, through Shirley Herman Construction Co., Buffalo.

THE SOUTH

- 836 Tons, New River, N. C., marine barracks, to Truscon Steel Co., Youngstown, through Blythe Brothers and Harrison Wright Co. Goode Construction Co., contractor.
- 400 Tons, Norfolk, Va., government buildings and additional hospitalization facilities for Norfolk Navy yard, to Truscon Steel Co., Youngstown, through R. R. Richardson Co. & Associates.
- 372 Tons, Corpus Christi, Tex., mesh for Naval air station, to Truscon Steel Co., Youngstown, through Brown-Bellows.
- 350 Tons, New River, N. C., mesh for marine barracks, to Truscon Steel Co., through Goode Construction Co.
- 318 Tons, Ypsilanti, Mich., sewage disposal plant for Ford Motor Co., to Truscon Steel Co., Youngstown, through Couse & Saunders.
- 200 Tons, Alabama, Coosa River ordnance plant, to Truscon Steel Co., Youngstown, through Sullivan-Long & Hagerty and Elgeron-Blair.
- 116 Tons, Chattanooga, Tenn., buildings for American Lava Co., to Truscon Steel Co., Youngstown, through Mark K. Willson Co.
- 108 Tons, Norfolk, Va., extension to building No. 184, Norfolk Navy Yard, to Truscon Steel Co., Youngstown, through Rust Engineering Co.

CENTRAL STATES

- 9000 Tons, East Alton, Ill., Western Cartridge Co., arms plant, divided between Sheffield Steel Corp., Kansas City, and Laclede Steel Co., St. Louis; Fruco Construction Co., contractor.
- 300 Tons, Omaha, U. S. Engineer, Invitation 225, to Sheffield Steel Corp., Kansas City.
- 240 Tons, Wright Field, Dayton, Ohio, engine test torque stand, to Truscon Steel Co., Youngstown, through Simpson Construction Co.
- 175 Tons, Detroit, Chrysler Corp., engine building, to Bethlehem Steel Co., Bethlehem, Pa.; W. E. Wood Co., contractor.
- 104 Tons, Kemp, Minn., paving, to Bethlehem Steel Co., through Oakes Construction Co., contractor.
- 100 Tons, Kansas City, Mo., Kansas Power & Light Co., to Sheffield Steel Co., Kansas City.

WESTERN STATES

- 920 Tons, San Diego, Cal., Navy pier, pier repairs, quay wall (Specification 10,456), to Soule Steel Co., Los Angeles, through M. H. Golden, San Diego, contractor.
- 675 Tons, Los Angeles, Southern California Gas Co. tank storage, to Blue Diamond Corp., Los Angeles, through Ford J. Twaits Co., Los Angeles, contractor.
- 450 Tons, Sacramento, Cal., Helvetia housing project, to Palm Iron Works, Sacramento, through Campbell Construction Co., Sacramento, contractor.
- 450 Tons, Ogden, Utah, warehouse and igloos, to Bethlehem Steel Co., Bethlehem, Pa., through Al Johnson and J. Leek, contractors.
- 245 Tons, Oakland, Cal., Army embarkation depot, to Truscon Steel Co., Youngstown, through A. Philip Murphy Corp.
- 225 Tons, Los Angeles, Los Angeles Shipbuilding Corp., warehouse and mold loft, to Blue Diamond Corp., Los Angeles.
- 110 Tons, Los Angeles, two State bridges at North Figueroa Street and Bishop's Road, to Trojan Steel, Los Angeles, through Contracting Engineers Co., Los Angeles, contractor.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

- 22,000 Tons, Washington, War department office building; John McShain Inc., contractor.
- 2000 Tons, Brooklyn Navy Yard, foundry, ordnance shop, and test laboratory; Thompson-Starrett Co., contractor.
- 400 Tons, Dunkirk, N. Y., factory and office building, Allegheny Ludlum Steel Co.; Gilmore, Carmichael & Olson, contractors.
- 400 Tons, State road and bridge over Boston & Maine Railroad.

SOUTH AND CENTRAL

- 3600 Tons, Jacksonville, Ark., Army fuse and detonator plant; Ford, Bacon & Davis, contractors.
- 2650 Tons, Norfolk, Va., superstructure, Naval base, pier 3; McLean Contracting Co., contractor.
- 2500 Tons, Hope, Ark., Southwestern Proving Grounds; W. E. Callahan, contractor.
- 350 Tons, Norfolk, Va., Naval operating base housing; Byrne Organizations, contractor.
- 300 Tons, Barrington, Ill., Jewel Food Stores building.
- 250 Tons, Chicago, Jewel Food Stores warehouse.

WESTERN STATES

- 870 Tons, San Francisco, Bernal Dwellings housing; Anderson & Ringrose, low bidders.
- 677 Tons, Mecca, Cal., All-American Canal (Invitation C-42, 210-A); bids in previously reported as 169 tons.
- 340 Tons, Araby, Ariz., mesh for Gila project (Invitation 24,844-A); bids taken.
- 220 Tons, Araby, Ariz., mesh for Gila project (Invitation 24,841-A); bids taken.

CANAL ZONE

- 1900 Tons, Panama Canal, schedule No. 5344.

NEW FOUNDLAND

- 1000 Tons, Army and Navy base requirements; New Foundland Base Contractors, general contractors.

Pipe Lines

• Illinois Natural Gas Co., Glenarm, Ill., plans new welded steel pipe line from Peoria to Galesburg, Ill., about 45 miles, for natural gas transmission for distribution in latter area.

Natural Gas Pipe Line Co. of America, Inc., 20 North Wacker Drive, Chicago, plans series of 26-in. welded steel pipe lines for loop installations on main line from natural gas field in Texas to Chicago, about 400 miles in all, for increased transmission of natural gas to latter district. Cost estimated at \$20,000,000 with booster stations and other operating facilities. Company is arranging for sale of bond issue of \$22,500,000 and for other financing in amount of \$7,500,000, from which construction sum noted will be secured.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 19 for about 6500 ft. of steel pipe and steel tubing for Mare Island Navy Yard, Vallejo, Cal. (Circular 8170).

Western Gas Co., 605 Sixth Street, Bremerton, Wash., has authorized extensions in pressure pipe line for gas transmission to East Park district for service to large housing project, totaling about 11,800 ft. of 4-in. pipe in Eleventh, Twelfth and Thirteenth Streets, and Park, Pacific and Highland Avenues.

Constructing Quartermaster, Fort Lewis, Wash., has let contract to Lord & Loryea, 4507 S. E. Milwaukee Street, Portland, Ore., at \$148,943, for pipe line system for gasoline distribution, with storage tanks and other facilities for fueling service at Grays Field, Fort Lewis.

A group of 10 oil companies, acting jointly, has engaged Aero Exploration Co., 1850 South Boulder Street, Tulsa, Okla., to make aerial survey of proposed route of new welded steel pipe line from Longview, in east Texas oil field to Philadelphia and New York, about 1560 miles in all, for crude oil transmission. Line will be 22-in. from Longview to Salem, Ill., and 24-in. from that point to Eastern district noted; a 16-in. connecting line will be built from Salem to Woodriver, Ill., where other pipe lines from Texas and Mid-continent oil field districts converge. Proposed line will have estimated capacity of 200,000 bbl. per day, with booster pumping stations and other operating facilities, and is estimated to cost about \$70,000,000. Financing will be provided by government. Companies affiliated with project include Standard Oil Co. of New Jersey, Socony-Vacuum Oil Co., Texas Corp., Consolidated Oil Co., Tide Water Associated Oil Co., and Cities Service Oil Co., all of New York; Sun Oil Co., and Atlantic Refining Co.,

both of Philadelphia; Gulf Oil Corp., Pittsburgh; and Shell Oil Co., St. Louis. Project will be carried out as a national defense measure.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., closes bids Aug. 13 for 10,000 ft. of 1-in. welded black steel pipe (Proposal 188).

Spencer, Iowa, will take bids soon for underground pressure pipe line system for steam distribution in business district for heating service. Cost about \$60,000. Pillsbury Engineering Co., 1200 Second Avenue South, Minneapolis, Minn., is consulting engineer.

Cast Iron Pipe

• Medina, Ohio, plans pipe line extensions in water system and other waterworks installation. Cost about \$30,000. It is proposed to arrange bond issue in that amount. Edward Barstow, 31 North Summit Street, Akron, Ohio, is consulting engineer.

Water Department, Sandusky, Ohio, A. J. Lauber, city manager, plans pipe line extensions in water system, including new main line to Plum Brook ordnance plant near city, now in course of construction, where service will be furnished, and other extensions for supply to industrial plants in that area. Cost about \$500,000. Financing is being arranged through Federal aid. R. R. Smith is city engineer.

Brownwood, Tex., plans pipe line extensions and improvements in water system, and other waterworks installation. Cost about \$320,900. Julian Montgomery, Littlefield Building, Austin, Tex., is consulting engineer.

War Department, Galveston, Tex., plans pipe line extensions and replacements in water system; also other waterworks installation, including new wells and increased pumping facilities, storage reservoir, addition to booster pumping station at Alta Loma, and other work. Cost about \$1,280,000. Financing will be arranged through Federal aid. Ford, Bacon & Davis, Inc., Santa Fe Building, Dallas, Tex., is consulting engineer.

Corry Water Service Co., Corry, Pa., plans pipe line extensions and improvements in system.

Water Department, Springfield, Mass., plans pipe line extensions in water system, including new main 50-in. supply line to Provin Mountain reservoir, about eight miles; also other waterworks installation. Cost close to \$1,000,000.

New Book Published on Machine Shop Practice

New York

• • • Designed for use in schools, vocational courses, factory reference libraries and for home study, particularly in connection with defense training programs, is the "New Encyclopedia of Machine Shop Practice," to be published in early August by Wm. H. Wise & Co., New York. There are 1000 illustrations and an appendix containing many tables, with 2800 items listed and indexed. George W. Barnwell, professor of production practice at Stevens Institute of Technology, is the authority responsible for the text. Included are detailed explanations of the operation of the lathe, milling machine and centerless grinder. Gear cutting, heat treatments, forge and foundry work are also covered.

Prices of Finished Iron and Steel...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point ↓ Product													DELIVERED TO		
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	
Long ternes ²	3.80¢		3.80¢									4.55¢			
STRIP															
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢		
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢		
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢								
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢		
TIN PLATE															
Standard cokes (Per 100-lb. base box)	\$5.00	\$5.00	\$5.00						\$5.10						
BLACK PLATE															
29 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (¹⁰)			
TERNES, MFG.															
Special coated (Per base box)	\$4.30		\$4.30						\$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢		
Reinforcing (rail) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.25¢		
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)						
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢ (¹¹)		(Coatesville and Claymont = 2.10¢)	2.45¢	2.65¢	2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	
Alloy	3.50¢	3.50¢													
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢				(Worcester = 3.00¢)							
0.51 to 0.75 Carbon	4.30¢			4.30¢				(Worcester = 4.50¢)							
0.76 to 1.00 Carbon	6.15¢			6.15¢				(Worcester = 6.35¢)							
1.01 to 1.25 Carbon	8.35¢			8.35¢				(Worcester = 8.55¢)							
WIRE⁹															
Bright	2.60¢	2.60¢		2.60¢	2.60¢			(Worcester = 2.70¢)							
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢			(Worcester = 2.70¢)							
Spring	3.20¢	3.20¢		3.20¢				(Worcester = 3.30¢)							
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			
IRON BARS															
Common		2.25¢						(Terre Haute, Ind. = 2.15¢)							
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

¹ Mill run sheets are 10c. per 100 lb. less than base; and primes only. 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to 29 gage within certain width and length limitations. ⁶ For merchant trade. ⁷ Straight lengths as quoted by distributors. ⁸ Also shafting. For quantities of 20,000 to 39,999 lb. ⁹ Carload lot to manufacturing trade. ¹⁰ Boxed. ¹¹ Ship plates only.

PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are \$2 higher f.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton
Rerolling\$34.00
Forging quality 40.00

Shell Steel

Basic open hearth shell steel f.o.b. Pittsburgh and Chicago.

Per Gross Ton
3 in. to 12 in.\$52.00
12 in. to 18 in. 54.00
18 in. and over. 56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity. This type of steel is for hot rolled sections used for the forging of shells and includes rounds, round squares, and special sections.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton
Open hearth or bessemer.....\$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.
Grooved, universal and sheared 1.90c.

Wire Rods

(No. 5 to 9/32 in.) *Per Lb.*
Pittsburgh, Chicago, Cleveland 2.00c.
Worcester, Mass. 2.10c.
Birmingham 2.00c.
San Francisco 2.50c.
Galveston 2.25c.
9/32 in. to 47/64 in., \$3 a net ton higher. Quantity extras apply.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh; Package, 112 Sheets)
20x14 in. 20x28 in.
8-lb. coating I.C... \$6.00 \$12.00
15-lb. coating I.C... 7.00 14.00
20-lb. coating I.C... 7.50 15.00
25-lb. coating I.C... 8.00 16.00
30-lb. coating I.C... 8.63 17.25
40-lb. coating I.C... 9.75 19.50

WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)
Base per Keg
Standard wire nails.....\$2.55
Coated nails 2.55
Cut nails, carloads 3.85
Base per 100 Lb.
Annealed fence wire.....\$3.05
Base Column
Woven wire fence*..... 67
Fence posts (carloads)..... 69
Single loop bale ties.....59
Galvanized barbed wire†..... 70
Twisted barbless wire..... 70

*15½ gage and heavier. †On 80-rod spools in carload quantities.
Note: Birmingham base same on above items, except spring wire.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List
Machine and carriage bolts:
½ in. and smaller by 6 in. and shorter65½
9/16 and 5/8 in. by 6 in. and shorter63½
¾ to 1 in. by 6 in. and shorter.61
1½ in. and larger, all lengths..59
All diameters over 6 in. long..59
Lag, all sizes62

Plow bolts65
Nuts, cold punched or hot pressed, hex. or square:
½ in. and smaller.....62
9/16 to 1 in. inclusive.....59
1½ to 1½ in. inclusive.....57
1½ in. and larger.....56

On above items, excepting plow bolts, additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts U.S.S. S.A.E.
7/16 in. and smaller... .. 64
½ in. and smaller..... 62
½ in. through 1 in.... 60
9/16 to 1 in..... 59
1½ in. through 1½ in. 57
1½ in. and larger..... 56

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose 71 and 10

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York lots of 200 lb. or over.

Stove bolts in packages, with nuts attached71
Stove bolts in bulk.....80

Large Rivets

(½ in. and larger) *Base per 100 Lb*
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham\$3.75

Small Rivets

(7/16 in. and smaller) *Per Cent Off List*
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham65 and 5

Cap and Set Screws

Per Cent Off List
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller 64
Upset set screws, cup and oval points 71
Milled studs 46
Flat head cap screws, listed sizes 36
Filister head cap screws, listed sizes 51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

NON-FERROUS PRICES

Cents per lb. for early delivery

	July 30	July 31	Aug. 1	Aug. 2	Aug. 4	Aug. 5
Copper, Electrolytic¹	12.00	12.00	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00	12.00	12.00
Tin, Straits, New York²	53.00	52.50	52.75	52.75	52.75	51.75
Zinc, East St. Louis	7.25	7.25	7.25	7.25	7.25	7.25
Lead, St. Louis³	5.70	5.70	5.70	5.70	5.70	5.70

¹ Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. ² Add 0.39c. for New York delivery. ³ Add 0.15c. for New York delivery.

Warehouse Products

Cents per lb., Delivered

	New York	Cleveland
Tin		
Straits, pig	53.75	55.00
Copper		
Electro	13.00	13.25
Castings	12.50	13.15
H. R. Sheets*	20.87	20.87
Seamless tubes*	21.37	21.37
Brass		
Yellow sheets*	19.48	19.48
Yellow, rods*	15.01	15.01
Seamless tubes*	22.23	22.23
Zinc		
Slabs	Nom'al	Nom'al
Sheet, No. 9 casks	Nom'al	Nom'al
Lead		
American pig	6.85	6.35
Bar	8.70	8.85
Cut sheets	9.00	9.10
Antimony		
Asiatic	16.00	17.00
Aluminum		
Virgin, 99%	20.00	21.00
No. 1 remelt, 98-99%	18.00	18.50
Solder		
½ and ½	32.125	32.75
Babbitt		
Anti-friction grade	23.50	21.75

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper		
Hvy. crucible	11.375	12.00
Hvy. and wire	10.375	10.875
Light and bottoms	9.125	9.625
Brass		
Heavy	7.00	7.50
Light	5.50	6.25
No. 1 yel. turn	6.25	6.75
No. 1 red or compo. turnings	9.75	10.75
Hvy. Mach. compo.	10.00	10.25
Lead		
Heavy	5.00	5.50
Aluminum		
Cast	11.00	12.00
Sheet	12.00	13.50
Zinc		5.10

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 17c.-18c. a lb.; No. 12 remelt No. 2, standard, 16c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICKSILVER, \$190, per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 3¾; on brass sheets and rods, 40; on brass tubes, 3¾, and copper tubes, 40.

PRICES

ALLOY STEEL

Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem.....\$54.00

Alloy Steel Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade2.70c.
Delivered, Detroit2.80c.

S.A.E.
Series
Numbers

Alloy
Differential,
per 100 Lb.

2000 (1.5 Ni)\$0.35

2100 (1.5 Ni)	0.75
2300 (3.5 Ni)	1.70
2500 (5 Ni)	2.55
3100 Ni-Cr	0.70
3200 Ni-Cr	1.35
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo.)..	0.55
4100 Cr-Mo (0.25 to 0.40 Mo.)..	0.75
x4340 Cr-Ni-Mo	1.70
4340 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.2-0.3 Mo, 1.5-2 Ni)	1.20
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr)	0.45
5100 Cr spring steel	0.15
52-100 Cr. (electric furnace)...	2.60
6100 Cr-V bar	1.20

C-V	0.85
6100 Cr-V spring steel	0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c. carlots.

Alloy Steel Plates

Base per lb., f.o.b. Pittsburgh, Chicago and Coatesville.
Open hearth grade .. 3.50c.



FIRST LINE QUALITY Starts with PICKLING

WHEELING BRONZE SHEET PICKLERS—

are outstanding in performance—because of the oscillating feature—found only in this line of Batch Picklers.

Use this type of mechanical pickler to reduce your pickling cost.

WRITE TODAY



STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chromium-Nickel

No.	304	302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes ..	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip.....	23.50c.	21.50c.
Cold rolled strip.....	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium

No.	410	430	442	446
Bars ..	18.50c.	19.00c.	22.50c.	27.50c.
Plates ..	21.50c.	22.00c.	25.50c.	30.50c.
Sheets ..	26.50c.	29.00c.	32.50c.	36.50c.
H'tstrip	17.00c.	17.50c.	24.00c.	35.00c.
C'd st.	22.00c.	22.50c.	32.00c.	52.00c.

20% Chromium-Nickel Clad Steel

No.	304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

TOOL STEEL

(F.o.b. Pittsburgh)

	Base per Lb.
High speed	67c.
High-carbon-chromium	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

ELECTRICAL SHEETS

(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

PRICES

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago..	\$54.80
3-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham..	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall
(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Lap Weld, Hot Rolled
1 in. o.d. 13 B.W.G.	\$9.01	\$7.82
1 1/4 in. o.d. 13 B.W.G.	10.67	9.26
1 1/2 in. o.d. 13 B.W.G.	11.70	10.23
1 3/4 in. o.d. 13 B.W.G.	13.42	11.64
2 in. o.d. 13 B.W.G.	15.03	13.04
2 1/4 in. o.d. 13 B.W.G.	16.76	14.54
2 1/2 in. o.d. 12 B.W.G.	18.45	16.01
2 3/4 in. o.d. 12 B.W.G.	20.21	17.54
3 in. o.d. 12 B.W.G.	21.42	18.59
3 1/2 in. o.d. 11 B.W.G.	22.48	19.50
3 1/2 in. o.d. 11 B.W.G.	28.37	24.62
4 in. o.d. 10 B.W.G.	35.20	30.54
4 1/2 in. o.d. 10 B.W.G.	43.04	37.35
5 in. o.d. 9 B.W.G.	54.01	46.87
6 in. o.d. 7 B.W.G.	82.93	71.96

Extras for less carload quantities:	
40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
(F.o.b. Pittsburgh only on wrought iron pipe)

Base Price = \$200 Per Net Ton
Butt Weld

Steel	Black	Galv.
1/8 in.	56	33
1/4 to 3/8 in.	59	40 1/2
1/2 in.	63 1/2	51
3/4 in.	66 1/2	55
1 to 3 in.	68 1/2	57 1/2

Wrought Iron	Black	Galv.
1/4 and 3/8 in.	+9	+33
1/2 in.	24	3 1/2
3/4 in.	30	10
1 and 1 1/4 in.	34	16
1 1/2 in.	38	18 1/2
2 in.	37 1/2	18

Lap Weld

Steel	Black	Galv.
2 in.	61	49 1/2
2 1/2 to 3 in.	64	52 1/2
3 1/2 to 6 in.	66	54 1/2
7 and 8 in.	65	52 1/2
9 and 10 in.	64 1/2	52
11 and 12 in.	63 1/2	51

Wrought Iron	Black	Galv.
2 in.	30 1/2	12
2 1/2 to 3 1/2 in.	31 1/2	14 1/2
4 in.	33 1/2	18
4 1/2 to 8 in.	32 1/2	17
9 to 12 in.	38 1/2	12

Butt weld, extra strong, plain ends

Steel	Black	Galv.
1/8 in.	54 1/2	38 1/2
1/4 to 3/8 in.	56 1/2	42 1/2
1/2 in.	61 1/2	50 1/2
3/4 in.	65 1/2	54 1/2
1 to 3 in.	67	57

Wrought Iron

1/4 and 3/8 in.	+10	+46
1/2 in.	25	6
3/4 in.	31	12
1 to 2 in.	38	19 1/2

Lap weld, extra strong, plain ends

Steel	Black	Galv.
2 in.	59	48 1/2
2 1/2 and 3 in.	63	52 1/2
3 1/2 to 6 in.	66 1/2	56

	Black	Galv.
7 and 8 in.	65 1/2	53
9 and 10 in.	64 1/2	52
11 and 12 in.	63 1/2	51

Wrought Iron

2 in.	33 1/2	15 1/2
2 1/2 to 4 in.	39	22 1/2
4 1/2 to 6 in.	37 1/2	21
7 and 8 in.	38 1/2	21 1/2
9 to 12 in.	32	17 1/2

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher, on all butt weld 8 in. and smaller.

These are the Reeves "SPEED-UP" UNITS

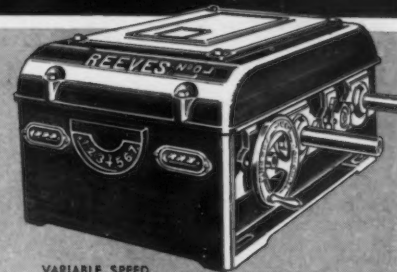
for getting more production out of the machines you already have

There's no need to shrug your shoulders and "give up" if you can't get the new machines you need. Bring your old machines up to date with REEVES Variable Speed Control! Then you can speed them up or slow them down exactly as needed—for better production, faster production, or both.

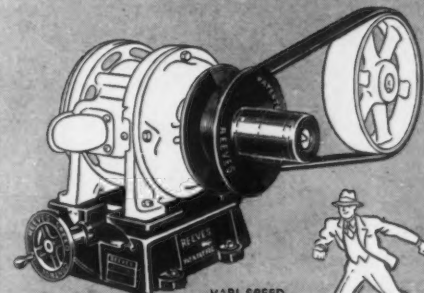
But get full-range speed control when you buy. Get REEVES Speed Control and have the advantages of stepless, infinite, variable speed adjustability. Get speed control that is positive and accurate throughout the entire speed range. The cost? A small part of your total production equipment investment. Many models and sizes of the three basic units pictured here to choose from.

EASY TO INSTALL

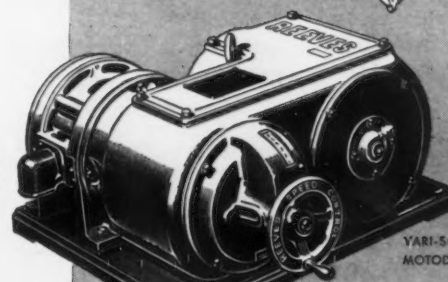
REEVES units are highly adaptable, space-saving. May be mounted in most any position. Nation-wide staff of seasoned engineers to help you choose the correct units for your needs.



VARIABLE SPEED TRANSMISSION



VARI-SPEED MOTOR PULLEY



VARI-SPEED MOTODRIVE

REEVES PULLEY COMPANY, Dept. 1, COLUMBUS, INDIANA

REEVES ACCURATE POSITIVE Speed Control

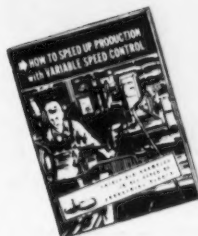
FREE—This Helpful, Production Speed-Up Book

Send copy of new 24-page book describing and illustrating how 36 different plants are speeding up production with accurate variable speed control.

Name.....Dept.....

Company.....

Address.....



PRICES

ORES

Lake Superior Ores

Delivered Lower Lake Ports	
	Per Gross Ton
Old range, bessemer, 51.50% ..	\$4.75
Old range, non-bessemer, 51.50% ..	4.60
Mesaba, bessemer, 51.50% ..	4.60
Mesaba, non-bessemer, 51.50% ..	4.45
High phosphorus, 51.50% ..	4.35

Foreign Ores*

C.i.f. Philadelphia or Baltimore. Exclusive of Duty	
	Per Unit
African, Indian, 44 to 48% Mn.	61c. to 65c.

African, Indian, 49 to 51% Mn.	71c. to 72c.
Brazilian, 46 to 48% Mn.	69c to 70c.
Cuban, del'd, duty free, 51% Mn.	.....

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered	\$24 to \$25
Tungsten, domestic, scheelite, delivered	\$24 to \$25
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton; South Cuban, 32%	\$18.00
Indian, 48-50%	\$38 to \$40
Rhodesian, 48%	\$35 to \$40

RAILS, TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., gross ton	\$40.00
Angle bars, 100 lb.	2.70

F.o.b. Basing Points

Light rails (from billets), gross ton	\$40.00
Light rails (from rail steel), gross ton	39.00

Base per Lb.

Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts, heat treated	5.00c.
Track bolts, discount to jobbers all sizes (per 100 counts)	65-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR Per Net Ton

Domestic washed gravel, 85 5 f.o.b. Kentucky and Illinois mines, all rail	\$22.00-23.00
Domestic, f.o.b. Ohio River landing barges	\$22.00-23.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines	\$22.00-23.00
Foreign, 85% calcium fluoride, not over 5% Si., c.i.f. Atlantic ports, duty paid	Nominal
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	31.00
As above, in bags, f.o.b. same mines	32.60

REFRACTORIES

Fire Clay Brick Per 1000 f.o.b. Works	
Super-duty brick at St. Louis ..	\$64.60
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	51.30
First quality, New Jersey	56.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri, and Illinois	46.55
Second quality, New Jersey	51.00
No. 1 Ohio	43.00
Ground fire clay, per ton	7.60

Silica Brick	
Pennsylvania	\$51.30
Chicago District	58.90
Birmingham	51.30
Silica cement, net ton (Eastern) ..	9.00

Chrome Brick Net per Ton	
Standard f.o.b. Baltimore, Plymouth Meeting and Chester ..	\$54.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	54.00

Magnesite Brick	
Standard f.o.b. Baltimore and Chester	\$76.00
Chemically bonded, f.o.b. Baltimore	65.00

Grain Magnesite	
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	(—)*
Domestic, f.o.b. Baltimore and Chester in sacks	\$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

*None available

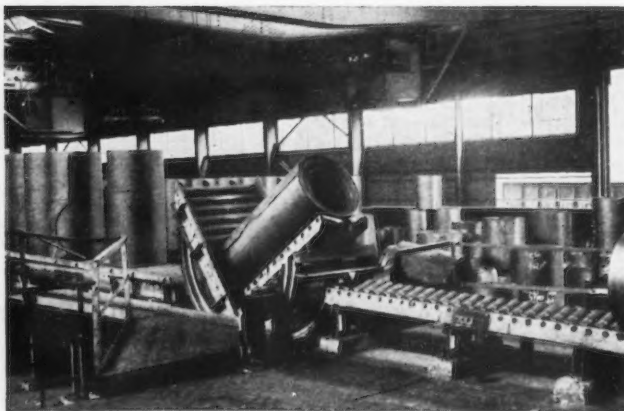
-MEN

-MACHINES

AND

Mathews

● If you have the required amount of manufacturing equipment and the right type of trained personnel, and still production lags, you may lack the one thing necessary to a continuous, smooth production flow — a practical method of uniting plant operations. It is in this regard that the experience of a Mathews Engineer might be of value to you.



INCREASED CAPACITY FOR NATIONAL DEFENSE

Our plant capacity has been increased over 65% to care for the rising demands of the National Defense Program — plus the normal demands of peacetime production.

All orders, whether subject to Defense priorities or not, are given the same helpful care and attention that have always marked our dealings with prospects and customers in the past.

MATHEWS CONVEYER COMPANY

114 TENTH ST. - - - - - ELLWOOD CITY, PA.

Field Engineers and Sales Offices located in 30 Industrial Centers.

PRICES

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton
Domestic, 80% (carload).....\$120.00
Domestic, 78-82%, carlots, f.o.b.
Tennessee furnaces 145.00

Spiegeleisen

Per Gross Ton Furnace
Domestic, 19 to 21%.....\$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

Per Gross Ton, Delivered Lump Size
50% (carload lots, bulk).....\$74.50*
50% (ton lots, packed)..... 87.00*
75% (carload, lots, bulk)....135.00*
75% (ton lots, packed).....151.00*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio
10.00 to 10.50%.....\$34.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2% \$1 per ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton, Silicon 6.00 to 6.50%
Jackson, Ohio\$29.50*
Buffalo, N. Y. 30.75*

For each additional 0.50% silicon up to 11.5%, \$1 a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed.

Manganese, each 0.50% over 1%, 50c. a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

*Official maximum prices established by OPACS on June 25.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots Lump Size, on Contract

4 to 6% carbon.....11.00c.
2% carbon17.50c.
1% carbon18.50c.
0.10% carbon20.50c.
0.06% carbon21.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon\$113.00*
2.50% carbon 118.00*
2% carbon 123.00*
1% carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload..... \$2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V, del'd \$2.70 to \$2.90†
Ferrocolumbium, per lb. contained columbium f.o.b. Niagara Falls, N. Y., ton lots \$2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C. f.o.b. furnace carload and contract, per net ton.....\$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C. f.o.b. furnace, carload and contract per net ton.....\$157.50
Ferrophosphorus, electric or blast furnace material, in

*Spot prices are \$5 per ton higher.

†Spot prices are 10c. per lb. of contained element higher.

carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton 58.50

Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsato (Siglo), Tenn., 24% per gross ton, \$3 unitage, freight equalized with Nashville 75.00

Ferromolybdenum, per lb. Mo., f.o.b. furnace 95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace 80c.

Molybdenum oxide briquettes 48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.
Molybdenum oxide, in cans, per lb. of contained Mo, f.o.b. Washington, Pa. 80c.

FUEL OIL

No. 3, f.o.b. Bayonne, N. J.....4.90c.
No. 6, f.o.b. Bayonne, N. J.....3.21c.
No. 5 Bur. Stds., del'd Chicago..3.25c.
No. 6 Bur. Stds., del'd Chicago..2.75c.
No. 3 distillate, del'd Cleveland..6.25c.
No. 4 indus., del'd Cleveland...5.75c.
No. 5 indus., del'd Cleveland...5.375c.
No. 6 indus., del'd Cleveland...5.00c.



**REDUCE FINISHING
COSTS WITH UDYLITE
AUTOMATIC BUFFING
AND POLISHING
EQUIPMENT !**

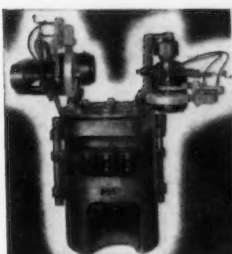
One Udylite automatic will do your parts finishing job, faster, better and more economically than a number of hand-operated lathes. Moreover, each piece will receive exactly the same treatment, ensuring uniformity, fewer rejects and a better finished product. Although every Udylite automatic is built especially to fit its job, it may be easily and inexpensively adapted to a wide variety of shapes and sizes of work.

If you are now buffing or polishing any quantity of parts by the slow manual system it will pay you to investigate the many worthwhile advantages of Udylite Automatic Equipment. Our engineers will be glad to help you solve your parts-finishing problems. Write today and get complete details.

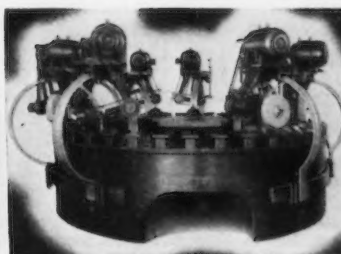
THE UDYLITE CORPORATION

1651 East Grand Blvd.

Detroit, Michigan



Two head, dial-type polisher. Handles work of several manually operated lathes.



Return-type, dial, automatic polisher—12' diameter table, eight ring-type heads. Ideal for high production of round or oddly shaped parts.



Ring-type, floating polishing head—exclusive on Udylite full automatics. Easily adjusted. Provides right pressure at all points.

PRICES

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, prompt	\$6.00 to \$6.25
Foundry, f.o.b. Connellsville, prompt	\$6.75 to \$7.00
F'dry, by-product, Chicago.....	10.50
F'dry, by-product, New England	13.75
Foundry, by-product, Newark or Jer- sey City	\$12.45 to 12.95
F'dry, by-product, Philadelphia.	12.13
F'dry, by-product, Cleveland...	12.30
F'dry, by-product, Cincinnati...	11.75
Foundry, Birmingham	8.50
F'dry, by-product, St. Louis	
	\$10.75 to \$11.00

BRITISH

Per Gross Ton, f.o.b. United Kingdom
Ports

Ferromanganese, export £29	16s. 3d.
Tin plate, per base box.	32s. to 33s.
Steel bars, open hearth...	£16 10s.
Beams, open hearth...	£19 10s.
Channels, open hearth...	£19 10s.
Angles, open hearth...	£15 10s.
Black sheets, No. 24, gage	
£22 5s. max.*	£22 5s. min.**
Galvanized sheets, No. 24 gage	
£25 12s. 6d max.*; £25 12s. 6d.	min.**

*Empire markets only.

**Other than Empire markets.

PIG IRON (Per Gross Ton)

All prices set in bold face type are maxima established by OPACS on June 24. Other domestic prices are delivered quotations computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.
Boston	\$25.50	\$25.00	\$26.50	\$26.00	.....
Brooklyn	27.50	.....	.....	28.00	.....
Jersey City	26.53	26.03	27.53	27.03	.....
Philadelphia	25.84	25.34	26.84	26.34	.....
Bethlehem, Pa.	\$25.00	\$24.50	\$26.00	\$25.50	.....
Everett, Mass.	25.00	24.50	26.00	25.50	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....
Steelton, Pa. ....	.....	24.50	.....	.....	\$29.50
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50
Sparrows Point, Md.	25.00	24.50	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....
Sharpsville, Pa.*	24.00	23.50	24.50	24.00	.....
Buffalo	24.00	23.00	25.00	24.50	29.50
Cincinnati .....	.....	24.61	.....	25.11	.....
Canton, Ohio	25.39	24.89	25.89	25.39	.....
Mansfield, Ohio	25.94	25.44	26.44	25.94	.....
St. Louis	24.50	24.02	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	.....
Granite City, Ill.	24.00	23.50	24.50	24.00	.....
Cleveland	24.00	23.50	24.50	24.00	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....
Toledo	24.00	23.50	24.50	24.00	.....
Youngstown*	24.00	23.50	24.50	24.00	.....
Detroit	24.00	23.50	24.50	24.00	.....
St. Paul	26.63	.....	27.13	26.63	.....
Duluth	24.50	.....	25.00	24.50	.....
Birmingham	20.38	19.00	25.00	.....	.....
Los Angeles, San Fran- cisco and Seattle....	27.50	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....
Montreal	27.50	27.50	.....	28.00	.....
Toronto	25.50	25.50	.....	26.00	.....

GRAY FORGE

Valley or Pittsburgh fee.....\$23.50

CHARCOAL

Lake Superior fee.....\$28.00
Lyles, Tenn, high phos. fee..... 28.50
Lyles, Tenn., low phos. fee..... 33.00
Delivered Chicago..... 31.34

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

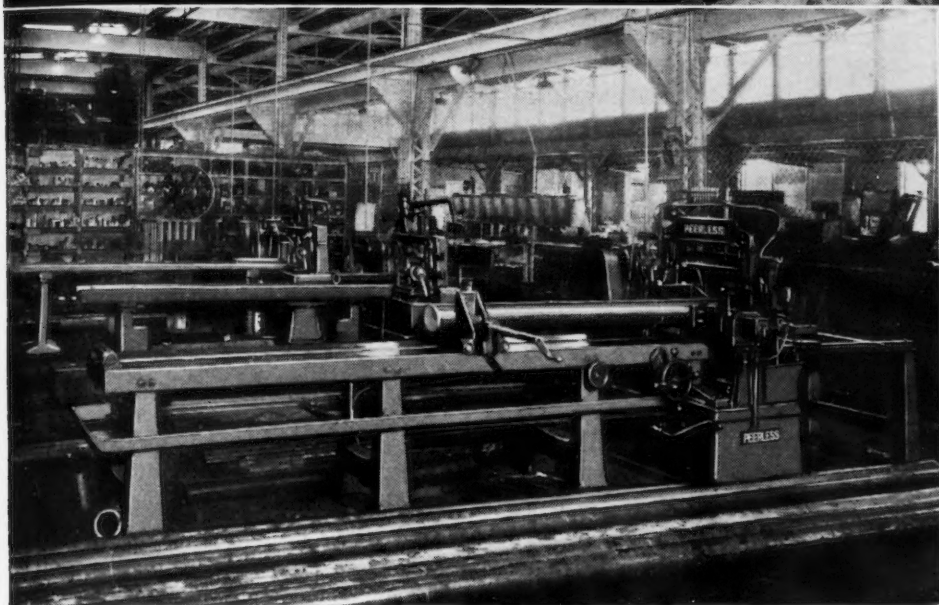
*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

WAREHOUSE PRICES

	Pitts- burgh	Chicago	Cleve- land	Phila- delphia	New York	Detroit	Buffalo	Boston	Birm- ingham	St. Louis	St. Paul	Mil- waukee	Los Angeles
Sheets, hot rolled	\$3.35	\$3.05	\$3.35	\$3.75	\$3.58	\$3.43	\$3.25	\$3.71	\$3.45	\$3.39	\$3.30	\$3.38	\$5.10
Sheets, cold rolled .....	.....	4.10	4.05	4.05	4.60	4.30	4.30	3.68	.....	4.24	4.35	4.23	7.30
Sheets, galvanized	4.75	4.60	4.75	5.00	5.00	4.84	4.75	5.11	4.75	4.99	4.75	4.98	6.30
Strip, hot rolled	3.60	3.40	3.50	3.95	3.96	3.68*	3.82	4.06	3.70	3.74	3.65	3.73	.....
Strip, cold rolled	3.20	3.30	3.20	3.31	3.51	3.20	3.52	3.46	.....	3.61	3.83	3.54	.....
Plates	3.40	3.55	3.40	3.75	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.95
Structural shapes	3.40	3.55	3.58	3.75	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.95
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	**4.15
Bars cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars ht. rld. SAE 2300.	7.20	7.10	7.55	7.31	7.60	7.67	7.35	7.50	.....	7.72	7.45	7.58	10.35
Bars ht. rld. SAE 3100.	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	.....	6.02	6.00	5.88	9.35
Bars cd. drn. SAE 2300.	8.15	8.15	8.40	8.56	8.84	8.70	8.40	8.63	.....	8.77	8.84	8.63	11.35
Bars cd. drn. SAE 3100.	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23	.....	7.12	7.44	6.98	10.35

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.0971 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., cold rolled strip 0.095 in. and lighter; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lbs.; Los Angeles, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 24 ga.—1 to 1499 lb. Extras for size, quality, etc., apply on above quotations
*12 gage and heavier. \$3.43. **Over 4 in. wide and over 1 in. thick, \$4.95.

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draulic control cuts S.A.E.
3140 bars . . . 1½" diam-
eter . . . 16 bars nested
. . . in 6 minutes, a total
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blade accurately cut 1500
sq. in. of this material.

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Mail cutting time estimate for.....

- ☐ Mail catalog on Hydraulic type Saw for High Production Cutting
- ☐ Mail catalog covering Vertical type used for Die Block Work
- ☐ Mail catalog on Mechanical type Saw for production cutting
- ☐ Mail catalog on general utility and maintenance Saws

Company.....

Individual.....

Street.....

City..... State.....

FAST, ACCURATE CUTTING DEMANDS POSITIVE BLADE CONTROL

Sales Possibilities

... CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic States

• **Norwood Stamping Co., Inc.**, Press Avenue, Norwood, Mass., wire rods and other wire goods, has approved plans for one-story addition, about 60 x 150 ft. Cost over \$50,000 with equipment. Harry J. Korslund, 153 Nahattan Street, is architect.

• **Remington Arms Co., Inc.**, Bridgeport, Conn., plans installation of additional equipment for shell production for War Department. Fund of \$225,000 has been arranged through Defense Plant Corp., Washington, for purchases.

• **Kinney Mfg. Co.**, 3541 Washington Street, Jamaica Plain, Boston, pumping machinery and parts, friction clutches, etc., has let general contract to Richard White Sons, Inc., 67 Cherry Place, Newton, Mass., for one-story addition, 55 x 230 ft. Cost over \$65,000 with equipment.

• **Bureau of Yards and Docks**, Navy Department, Washington, plans appropriation of \$3,000,000 for new fitting-out pier for submarine construction at Portsmouth, N. H., Navy Yard.

• **Storms Drop Forging Co.**, Storms Court, Springfield, Mass., has let general contract to Adams & Ruxton Construction Co., 1387 Main Street, for three one-story additions, 50 x 100 ft., 32 x 40 ft., and 32 x 66 ft., respectively, for expansion in heat-treating department, general production division and office. Cost close to \$85,000 with equipment. McClintock & Craig, Inc., 458 Bridge Street, is architect and engineer.

• **M-B Mfg. Co.**, New Haven, Conn., mechanical equipment, plans one-story addition for production of aircraft parts for Navy Department. Cost \$100,000 with equipment. Fund is being secured through Defense Plant Corp., Washington, supplementing previous appropriation of \$190,000 for project.

• **American Can Co.**, 230 Park Avenue, New York, has let general contract to Engineers, Ltd., 605 West Olympic Boulevard, Los Angeles, for one-story factory branch, storage and distributing plant, about 25,000 sq. ft. of floor space, on waterfront, San Diego, Cal. Cost about \$75,000 with equipment.

• **Williams & Williams Metal Windows, Ltd.**, 65 Hope Street, Brooklyn, has leased about 10,000 sq. ft. of floor space in building at 525 East Fourteenth Street, New York, for plant, removing present works to new location and expanding capacity.

• **Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until Aug. 12 for one photographic water cooler, with motor-driven air compressor, condenser and cooling tank, etc., for Brooklyn Navy Yard (Schedule 8063).

• **American Smelting & Refining Co.**, 120 Broadway, New York, has let general contract to James Stewart & Co., 230 Park Avenue, for new electrolytic zinc refinery at Corpus Christi, Tex., including furnaces, storage and distributing buildings, machine shop, laboratory, office and other structures. Cost close to \$5,000,000 with equipment.

• **Atlantic Basin Iron Works**, 168 Van Brunt Street, Brooklyn, plans expansion in shipbuilding plant for government vessels. Cost about \$1,000,000 with equipment. Fund in that amount will be provided by Defense Plant Corp., Washington.

• **Delaware, Lackawanna & Western Railroad Co.**, 140 Cedar Street, New York, C. C. Hubbell, general purchasing agent, asks bids until Aug. 11 for tie plates, spikes, angle bars, rails, etc. (Serial Contract No. 244).

• **Worthington Pump & Machinery Corp.**, Clinton and Roberts Streets, Buffalo, will begin erection of one-story addition, 120 x 262 ft., for expansion in pattern shop, for which general contract recently was let to Austin

Co., Cleveland. Cost about \$100,000 with equipment.

• **Harrison Radiator Division**, General Motors Corp., Lockport, N. Y., has let general contract to William B. Eaton Construction Co., Inc., Olson Building, for one-story addition. Cost about \$85,000 with equipment. Company is closing branch plant at 5475 Natural Bridge Avenue, St. Louis, owing to curtailment in automobile manufacture, and will handle production at Lockport works.

• **Clark Brothers Co.**, Lincoln Avenue, Olean, N. Y., oil and gas engines, parts, etc., has let general contract to H. K. Ferguson Co., Cleveland, for one-story addition, 100 x 200 ft. Cost over \$65,000 with equipment. Company is affiliated with Dresser Mfg. Co., Bradford, Pa.

• **Chevrolet Motor & Axle Division**, General Motors Corp., Tonawanda, N. Y., plans one-story addition, about 250,000 sq. ft. of floor space, in connection with conversion of plant for production of aircraft motors and parts for government. It will be used primarily for engine-testing. Cost over \$650,000 with equipment.

• **National Oil Products Co.**, Essex Street, Harrison, N. J., special refined oils and chemical products, plans branch plant at Richmond, Cal. Cost over \$100,000 with equipment.

• **Titellex Metal Hose Co.**, 500 Frelinghuysen Avenue, Newark, N. J., has acquired former plant of Arcturus Radio Tube Co., 708-20 Frelinghuysen Avenue, consisting of main three-story building, about 100,000 sq. ft. of floor space, two-story office, power house and other structures, on three-acre tract, for expansion for production of radio apparatus for government. This will provide in part for expansion recently noted in these columns.

• **RCA Mfg. Co., Inc.**, Cooper Street, Camden, N. J., has let general contract to H. K. Ferguson Co., Cleveland, for one-story addition, 300 x 650 ft., for storage and distribution. Cost over \$150,000 with equipment.

• **Western Electric Co.**, 100 Central Avenue, Kearny, N. J., telephone instruments and parts, wire and cable, etc., has leased plant of Central Stamping Co., 591 Ferry Street, Newark, N. J., about 275,000 sq. ft. of floor space, for expansion, including storage and distribution facilities. Building recently leased at Roselle, N. J., for storage and distribution, will be converted for expansion in manufacturing division.

• **Hygrade Sylvania Corp.**, Emporium, Pa., electric lamps, radio tubes, etc., has let general contract to F. M. Riegel, Emporium, for one-story addition for storage and distribution. Cost close to \$45,000 with equipment. Main offices are at Salem, Mass.

• **Ellwood City Forge Co.**, Ellwood City, Pa., steel forgings, etc., has let general contract to Pittsburgh Bridge & Iron Works, Inc., Union Bank Building, Pittsburgh, for one-story addition, about 85 x 200 ft., for a machine shop. Cost close to \$80,000 with equipment. C. E. Ziegler is company engineer.

• **Fox Grinders, Inc.**, Oliver Building, Pittsburgh, grinding equipment, has let general contract to Claude J. Lawrence, Trotwood Acres, near Pittsburgh, for new one-story plant, 60 x 85 ft., at Harmony, Pa. Cost close to \$45,000 with equipment.

• **Maryland Dry Dock Co.**, Fairfield, Baltimore, plans expansion in shipbuilding and repair plant for government vessels, including new shipways, docks, shops and other buildings, for which neighboring site is being acquired. Fund of about \$3,894,000 will be secured through Defense Plant Corp., Washington, of which approximately \$500,000 will be expended for machinery and equipment.

• **United States Engineer Office**, New Post Office Building, Pittsburgh, asks bids until Aug. 15 for one vertical, single-acting duplex air compressor, with all parts, for Emsworth dam and lock, Ohio River (Circular 2).

• **Baltimore Steel Co.**, 1400 Eastern Avenue, Baltimore, has let general contract to Cummins Construction Corp., 803 Cathedral Street, for two-story shop addition. Cost close to \$50,000 with equipment.

• **Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until Aug. 12 for 10 motor-driven engine lathes for Portsmouth, N. H., and Mare Island yards (Schedule 8074), five motor-driven combination metal-sawing, filing and polishing machines for Boston, Mare Island and Puget Sound yards (Schedule 8062); until Aug. 14 for 1,500,000 ft. of low-tension electric cable for Eastern and Western yards (Schedule 8111); until Aug. 15 for 1,250,000 ft. of bronze radio antenna wire for Brooklyn and Mare Island yards (Schedule 8096).

• **Pulverizing Machinery Co.**, Roselle Park, N. J., manufacturer of Mikro pulverizer, has let contract for new factory and office building, 100 x 200 ft., part two stories, on six-acre tract recently acquired at Summit, N. J. Louis Ruprecht is proprietor.

• **Lock Steel Chain Co.**, Bridgeport, Conn., will ask bids soon for plant addition to cost \$50,000 without equipment.

The South

• **Tampa Shipbuilding Co., Inc.**, Tampa, Fla., plans two one-story shops, for copper-working and other service. Cost over \$85,000 with equipment. W. Lee Elliott, Penthouse Citizens Building, is architect. This is part of expansion program under way for construction of vessels for government, for which loan of about \$2,000,000 has been secured through RFC.

• **E. I. du Pont de Nemours & Co., Inc.**, du Pont Building, Wilmington, Del., has contracted with War Department for new plant at Sylacauga, Ala., for production of TNT and DNT explosives, to be known as Alabama Ordnance Works. It will comprise one and multi-story buildings for processing and production, storage and distribution, machine works, and other service. Cost approximately \$25,761,000 for land, buildings and equipment. Fund in that amount will be secured through Defense Plant Corp., Washington.

• **Mississippi Power Co.**, Gulfport, Miss., is arranging fund of \$3,250,000 through bond issue, proceeds to be used for expansion and improvements in main steam-electric power plants, transmission and distributing lines, power substations and other facilities.

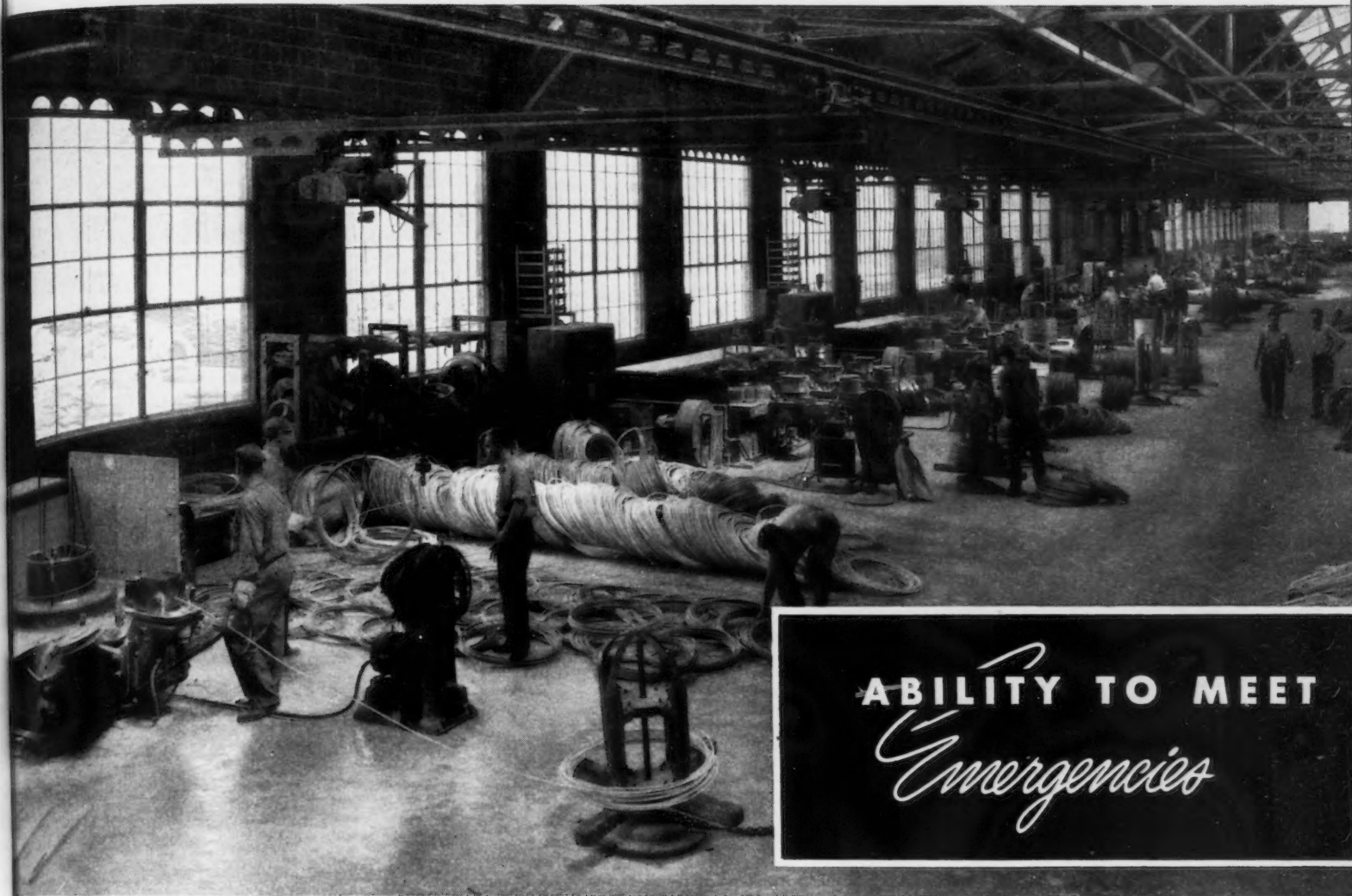
• **International Cellulose Products Co., Inc.**, 919 North Michigan Avenue, Chicago, gun cotton and other products for munitions, has let general contract to S. Malkin & Co., 160 Union Street, Memphis, Tenn., for new two-story plant, 230 x 360 ft., on Riverside Drive, Memphis. Cost close to \$200,000 with equipment. Hanker & Heyer, Commerce Title Building, Memphis, are architects.

• **Eastern Kentucky Rural Electric Cooperative Corp.**, Danville, Ky., J. V. Swain, president, recently organized, plans new steam-electric generating station for power supply for electrical rural cooperative associations in that part of State; also transmission lines and power substations for connection with various rural systems. Cost about \$2,500,000 with equipment. Financing will be arranged through Federal aid. P. M. Sullivan, Gallatin, Tenn., is engineer.

• **Wright's Automatic Tobacco Packing Machine Co.**, Calvin and Mangum Streets, Durham, N. C., has contracted with government for new local plant for production of ordinance for War Department. Cost about \$350,000 with equipment. Fund in that amount will be provided by Defense Plant Corp., Washington.

• **Wyatt Metal & Boiler Works**, Washington Street and line of Missouri-Kansas & Texas

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Railway, Houston, Tex., plans additions on adjoining 3½-acre tract, comprising one or more one-story units for increased capacity.

United States Engineer Office, Jacksonville, Fla., asks bids until Aug. 19 for hydroelectric power plant at St. Lucie dam, St. Lucie Canal, about eight miles from Stuart, Fla., for which bids will be received at same time; also for seven steel taintor gates, operating machinery, electrical system, metal work, etc.

Central States

• **American Steel Foundries**, Alliance, Ohio, plans expansion at local plant to double present capacity, comprising several one-story units on adjoining site for foundry and finishing divisions. Cost close to \$2,000,000 with equipment. Main offices are at 410 North Michigan Avenue, Chicago.

Artisan Metal Works Co., 11400 Madison Avenue, Cleveland, special sheet metal products, has asked bids on general contract for one-story addition, 60 x 85 ft. Cost close to \$45,000 with equipment. Walter G. Caldwell, Engineers' Building, is architect.

Cleveland Railway Co., Midland Building, Cleveland, has asked bids on general contract for one-story addition to car repair shop, 50 x 150 ft., at East Cleveland. Cost about \$60,000 with equipment. Wilbur Watson & Associates, 4614 Prospect Avenue, are engineers.

B. F. Goodrich Co., Inc., Akron, Ohio, has organized a subsidiary under name of Lone Star Defense Corp., to build plant on 24,300-acre tract near Texarkana, Tex., for bomb and shell-loading for War Department, to include machine shops, power house and other structures. Contract has been let jointly to Winston Brothers Co., Northwest Bank Building, and C. F. Haglin & Sons, Inc., National Building, both Minneapolis, Minn.; Missouri Valley Bridge & Iron Works, Inc., Leavenworth, Kan.; and Sollitt Construction Co., South Bend, Ind. Company has secured fund of \$33,500,000 through Defense Plant Corp., Washington, for project.

Tremco Mfg. Co., Inc., 393 East 131st Street, Cleveland, roofing products, has let general contract to Paugh & Brown, Inc., 6007 Euclid Avenue, for new one and two-story plant, 200 x 250 ft., at Taft Avenue and East 131st Street. Part of structure will be used for varnish manufacture. Cost about \$125,000 with equipment. Christian, Schwarzenberg & Gaede, 1836 Euclid Avenue, are architects and engineers.

Pipe Machinery Co., 930 Seventieth Street, Cleveland, pipe and tube mill machinery, plans expansion for production of machine tool equipment for government. Fund of \$200,000 has been arranged through Defense Plant Corp., Washington, for equipment.

Colgate-Palmolive-Peet Co., Inc., Jeffersonville, Ind., soap products, etc., has asked bids on general contract for two and four-story addition. Cost close to \$500,000 with equipment. Main offices are at Jersey City, N. J. Benjamin A. Pawlik is company engineer, last noted address.

General Electric Co., Schenectady, N. Y., plans new works at Fort Wayne, Ind., for production of turbo-superchargers for airplanes for War Department, consisting of main one-story unit, 500 x 800 ft., and smaller structures. Cost about \$20,000,000, of which approximately \$15,000,000 will be expended for equipment. Fund in gross amount will be secured through Defense Plant Corp., Washington.

St. Louis Car Co., 8000 North Broadway, St. Louis, will carry out erection of new plant at 600 Bittner Street, for aircraft parts production, by company forces, superstructure to begin at once. It will consist of three one-story units, 240 x 300 ft., 160 x 232 ft., and 75 x 232 ft., and will be operated by St. Louis Aircraft Corp., first noted address, a subsidiary. Cost close to \$200,000 with equipment.

Construction Quartermaster, Fort Leonard Wood, Rolla, Mo., has let contract to Tulsa Rig, Reel & Mfg. Co., Philtowers Building, Tulsa, Okla., at \$571,600 for one-story machine and motor repair shops, oil storage and distributing buildings, grease and inspection

structures, and other mechanical shops at local ordnance depot.

Vickers, Inc., 1400 Oakman Boulevard, Detroit, hydraulic pumps and parts, motors and kindred products, has let general contract to Brown & Matthews, Inc., 122 East Forty-second Street, New York, for one-story addition, about 200 x 250 ft. Cost over \$150,000 with equipment.

Baldwin Rubber Co., Inc., Pontiac, Mich., rubber flooring and other hard rubber products, has let general contract to Darin & Armstrong, Inc., 2041 Fenkel Street, Detroit, for two-story addition for expansion in flooring division. Cost close to \$50,000 with equipment. L. J. Heenan, Pontiac, is architect.

Continental Aviation & Engineering Corp., 12801 East Jefferson Avenue, Detroit, a subsidiary of Continental Motors Corp., plans expansion for production of airplane engines for government, including additional machinery. Fund of about \$5,000,000 will be secured through Defense Plant Corp., Washington, for project, majority of appropriation to be used for equipment.

Kalamazoo Vegetable Parchment Co., Parchment, Kalamazoo, Mich., waxed and other processed paper stocks, has let general contract to Miller-Davis Co., Kalamazoo, for one-story addition, 100 x 350 ft., for expansion in production, storage and distribution divisions. Cost close to \$125,000 with equipment.

National Stamping Co., 630 St. Jean Street, Detroit, has let general contract to W. J. C. Kaufmann Co., 10610 Shoemaker Street, for one-story addition for storage and distribution. Cost about \$45,000 with equipment.

General Electric X-Ray Corp., 2012 West Jackson Boulevard, Chicago, x-ray apparatus and parts, has let general contract to James Stewart Corp., 343 South Dearborn Street, for one-story addition, including extension in boiler house. Cost about \$75,000 with equipment. Graham, Anderson, Probst & White, 80 East Jackson Boulevard, are architects.

A. O. Smith Corp., 3533 North Twenty-seventh Street, Milwaukee, has let general contract to Wisconsin Bridge & Iron Co., 5023 North Thirty-fifth Street, for one-story addition, 175 x 300 ft. Cost over \$170,000 with equipment.

Frederick H. Levey Co., Inc., 4250 West Forty-second Place, Chicago, printing inks, has approved plans for one-story addition, 75 x 140 ft., with foundations for an additional story later. Cost over \$75,000 with equipment. A. Epstein, 2001 West Pershing Road, is architect and engineer.

Metal Cutting Tools, Inc., Rockford, Ill., plans expansion, including additional equipment, for production for government. Equipment purchases will total about \$250,000. Fund in that amount will be secured through Defense Plant Corp., Washington.

Minneapolis-Moline Power Implement Co., Minneapolis, Minn., has let contract for superstructure for one-story addition, 140 x 325 ft., at Hopkins, to E. M. Ganley Co., Inc., 2922 Oakland Avenue, for expansion in assembling division. Cost close to \$250,000 with equipment.

Cleereman Machine Tool Co., Elm and Elizabeth Streets, Green Bay, Wis., has begun superstructure for one-story addition, 60 x 100 ft. F. R. Martell, 1467 Kurtz Avenue, is general contractor. Cost close to \$45,000 with equipment.

Water, Light and Power Department, Warren, Minn., asks bids until Aug. 12 for one diesel engine-generating unit, 175 to 250-kva., with auxiliary equipment, for municipal power plant, where expansion will be carried out.

Western States

• **Grove Regulator Co.**, 1729 Poplar Street, Oakland, Cal., engineering specialties, has let general contract to W. K. Owen, 1501 Powell Street, for new one-story plant at Berkeley, Cal. Cost close to \$50,000 with equipment.

Hamburgh Iron Works, Inc., Mount Vernon, Wash., plans rebuilding part of plant recently destroyed by fire. Loss close to \$100,000 with equipment.

Columbia River Paper Mills, Inc., Vancouver, Wash., writing, tissue and other paper

stocks, has approved plans for addition to main paper-making division. Cost close to \$100,000 with new paper-making machine and auxiliary equipment.

Goodyear Aircraft Corp., Akron, Ohio, subsidiary of Goodyear Tire & Rubber Co., has asked bids on general contract for new plant at Litchfield Park, about 15 miles from Phoenix, Ariz., for airplane parts production. Cost about \$500,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 12 for one geared trimming press (Schedule 8069), six milling machines (Schedule 8076) all motor-driven, for Mare Island Navy Yard, Vallejo, Cal.

Menasco Mfg. Co., 805 East San Fernando Boulevard, Burbank, Cal., aircraft motors and parts, plans expansion in hydraulic strut division for production for government, and will install equipment to triple present output. Fund of about \$1,639,000 has been secured through Defense Plant Corp., Washington, for project.

Utah Copper Co., Salt Lake City, Utah, plans new steam-electric generating station at Garfield, Utah, for service at Magna and Arthur copper mills in that district. Cost over \$4,000,000 with turbine-generators and accessories, high-pressure boilers and auxiliary equipment.

Puget Sound Machinery Depot, 3451 First Avenue South, Seattle, has let general contract to General Construction Co., 3840 Iowa Avenue, for one-story addition, 100 x 100 ft., for expansion in boiler and tank shop. Cost close to \$50,000 with equipment.

Canada

• **Department of Munitions and Supply**, Ottawa, plans new shipbuilding and repair plant at Westmont, N. S., to include shipways, docks, mechanical and shops, and other shop units. Cost close to \$2,000,000 with equipment.

McColl-Frontenac Oil Co., Ltd., 117 Harbour Street, Toronto, has acquired 60 acres in Bonnybrook district, East Calgary, Alta., for new oil refinery, to include one and multi-story production units, steel tank storage and distribution facilities, power house, pumping station, machine shop and other structures. Cost close to \$1,000,000 with machinery. Crude oil supply will be secured by pipe line from Turner Valley and neighboring oil fields.

Fairchild Aircraft, Ltd., Longueuil, Que., has let general contract Deakin & Stewart, Ltd., 1440 St. Catherine Street West, Montreal, for one-story addition for expansion in assembling division. Cost over \$75,000 with equipment.

Canadian Vickers, Ltd., 5136 Notre Dame Street East, Montreal, aircraft and marine engines, etc., will start work soon on a plant addition to cost \$100,000 with equipment.

Department of Munitions and Supply, Ottawa, G. K. Sheils, secretary, has awarded general contract to Anglin-Norcross Corp., Ltd., 892 Sherbrooke Street West, Montreal, other sub-trades for an addition to shops at Quebec formerly owned by Canadian National Railways. Cost, with equipment, \$500,000.

Halifax Shipyards, Ltd., Halifax, N. S., has plans for a machine shop at Dartmouth, N. S., to cost \$50,000. New equipment will be purchased.

Davie Shipbuilding & Repairing Co., Ltd., 25 Davie Street, Lauzon, Que., plans an addition to shipyards and dock to cost \$125,000.

Dominion Loose Leaf Co., Ltd., 278 Sparks Street, Ottawa, Ont., has plans for a factory addition to cost \$35,000, for manufacture of office supplies, etc.

Brading Breweries, Ltd., 451 Wellington Street, Ottawa, plans erection of addition, to cost about \$60,000 with equipment.

Union Gas Co. of Canada, Ltd., 48 Fifth Avenue, Chatham, Ont., has plans for erection of a \$1,000,000 gas plant at Sarnia, Ont.

Burt Business Forms, Ltd., Mount Dennis, Toronto, Ont., office supplies, etc., has plans by Earl L. Sheppard, 57 Queen Street West, Toronto, for a factory addition, to cost about \$50,000 with equipment. Fred W. Cuthbertson is purchasing agent.